

A Survey of Open Clusters in the $u'g'r'i'z'$ Filter System: III. Results for the Cluster NGC 188

Bartosz Fornal^{1,2,3}, Douglas L. Tucker^{2,4}, J. Allyn Smith^{4,5}, Sahar S. Allam^{2,4,6}, Cristin J. Rider⁷, and Hwankyung Sung⁸

ABSTRACT

We continue our series of papers describing the results of a photometric survey of open star clusters, primarily in the southern hemisphere, taken in the $u'g'r'i'z'$ filter system. The entire observed sample covered more than 100 clusters, but here we present data only on NGC 188, which is one of the oldest open clusters known in the Milky Way. We fit the Padova theoretical isochrones to our data. Assuming a solar metallicity for NGC 188, we find a distance of 1700 ± 100 pc, an age of 7.5 ± 0.7 Gyr, and a reddening $E(B - V)$ of 0.025 ± 0.005 . This yields a distance modulus of 11.23 ± 0.14 .

Subject headings: Galaxy: open clusters and associations: individual: NGC 188, Hertzsprung-Russell diagram, stars: abundances

¹Institute of Physics, Jagiellonian University, ul. Reymonta 4, 30-059 Kraków, Poland

²Fermi National Accelerator Laboratory, P.O. Box 500, Batavia, IL 60510

³Fermi National Accelerator Laboratory Internship for Undergraduate Physics Majors program

⁴Visiting Observer, United States Naval Observatory, Flagstaff Station, AZ

⁵Department of Physics & Astronomy, Austin Peay State University, P.O. Box 4608, Clarksville, TN 37044

⁶University of Wyoming, Department of Physics & Astronomy, Laramie, WY 82071

⁷Department of Physics & Astronomy, Johns Hopkins University, 3400 N. Charles St., Baltimore, MD 21218-2686

⁸Department of Astronomy & Space Science, Sejong University, Seoul, 143-747, Korea

1. Introduction

The study of open clusters is extremely important for improving our understanding of stellar and galactic evolution. In particular, knowledge of accurate fundamental parameters of star clusters (i.e., age, distance, reddening, metallicity) is essential for many astrophysical calibrations. It also contributes to a better explanation of the present Galactic disk properties and its past history. For example, precise measurements of age and distance of open clusters from the Sun tell us about their spatial and age distributions, which give invaluable insight into the disk structure. From these data it is possible to infer many characteristics of the Milky Way, like the thin-disk scale height, horizontal scale length, or the displacement of the Sun above the Galactic plane (see, Piskunov et al. 2006 and Bonatto et al. 2006). Furthermore, data on reddening for open clusters show important features of the interstellar extinction (Piskunov et al. 2006), which provides information on the Milky Way gas and dust distribution. Correctly calculated open cluster parameters are therefore essential to constrain Galactic theoretical models. Among all open clusters, the oldest ones are of special interest. Their age can be established quite easily and they may be detected at large distances thanks to their brightest members - strong-lined red giants (Friel 1995). Besides being fine tracers of the present structure and chemistry of the Galactic disk, they enable us to look at disk properties at epochs just after its formation, thus providing a reliable way to probe even the early disk evolution. Accurately estimated old open cluster basic parameters are then very useful for examining the disk-halo connection (Janes & Phelps 1994). As a result of being such a powerful tool for testing theories of star formation and metal enrichment in the Milky Way disk, open clusters, especially the old ones, have been the subject of intense studies for the past several decades (besides the papers mentioned above, see, Anthony-Twarog et al. 1979; Geisler & Smith 1984; Anthony-Twarog et al. 1994; Bruntt et al. 1999; Mathieu 2000).

We undertook a survey of (mostly) southern hemisphere star clusters using the $u'g'r'i'z'$ filter system (Smith et al. 2002; Rider et al. 2004; Rodgers et al. 2006). The initial effort in this survey delivered observations for approximately 105 open clusters and a few (less than 10) “low-density” globular clusters. The original motivation of the project was to use these clusters, which span a range of ages and metallicities, to “back calibrate” the Sloan Digital Sky Survey (SDSS) (see, York et al. 2000 and Adelman-McCarthy et al. 2006 for a description of the SDSS; Gunn et al. 2006 for a description of the SDSS 2.5 m telescope; Gunn et al. 1998 for a description of the SDSS imaging camera; and Fukugita et al. 1996, Hogg et al. 2001, Ivezić et al. 2004, and Tucker et al. 2006 for a description of the photometric calibration of the SDSS.) We are now using these data to verify the recent age and metallicity models presented in Girardi et al. (2004) and the prior work of Lenz et al. (1998) and to verify and expand upon the $u'g'r'i'z'$ to $UBVRI$ transformations presented in the SDSS standard star paper Smith et al. (2002). We have recently supplemented these data with observations of

northern hemisphere clusters using the United States Naval Observatory 1.0 m telescope.

In this, the third paper of our series, we present our results for the open cluster NGC 188. We chose this particular cluster because it is one of the oldest open clusters known in our galaxy. As described in Bonatto et al. (2005), it is located quite far from the galactic disk and contains a couple of hundred member stars. Its field is not heavily contaminated by background stars and it is also relatively free from dust (Bonatto et al. 2005). All this makes NGC 188 a perfect target for testing stellar evolution models.

NGC 188 was discovered in 1831 by John Herschel. Since then, Ivan King noticed in 1948 that this cluster is very interesting since its angular diameter is large when compared to the faint apparent magnitudes of its brightest stars (see, Sandage 1962a). In 1956 Sidney van den Bergh obtained the first results suggesting that NGC 188 belongs to the group of the oldest clusters (see, Sandage 1962a).

NGC 188 has been very carefully studied throughout the years, but the derivation of its characteristic parameters has had an erratic history. Table 1 presents a summary of past results on NGC 188. This table includes the reference paper (col. [1]), estimated distance modulus, in the brackets the corresponding distance (corrected for the reddening $E(B - V)$) (col. [2]), age (col [3]), $E(B - V)$ (col. [4]), metallicity $[Fe/H]$ (col. [5]), the technique used (col. [6]), and finally additional comments at the end.

One of the first studies of this cluster to determine age, distance and reddening is found in Sandage (1962a) and Sandage (1962b). In these two papers, Sandage estimated the age of this cluster to be 14 – 16 Gyr (based on Hoyle 1959 stellar models), the distance modulus $m - M$ to be 10.95, and the reddening $E(B - V)$ to be between 0.03 and 0.07, all these values depending on the chemical composition.

Revised values of NGC 188 parameters based on UBV photometry are presented in Eggen & Sandage (1969), who give an age of 10 Gyr, a distance modulus of 10.85, a reddening $E(B - V)$ of 0.09, and a metallicity $[Fe/H]$ of 0.07. During the following two decades estimates of the age varied from 3.6 Gyr (Torres-Peimbert 1971) and 4.3 Gyr (Twarog 1978) up to 10 Gyr (VandenBerg 1985, Adler & Rood 1985). Estimates of the metallicity ranged from $[Fe/H] = -0.6$ (Jennens & Helfer 1975) to as much as $[Fe/H] = 0.6$ (Spinrad et al. 1970). The estimates for the distance modulus fell within the range of 10.8 (Patenaude 1978) to 12.0 (Jennens & Helfer 1975), while estimates for the reddening $E(B - V)$ varied from 0.04 (Jennens & Helfer 1975) to 0.15 (Spinrad et al. 1970).

The analysis of color-magnitude diagrams performed by Twarog & Anthony-Twarog (1989) yielded an age between 6 and 7 Gyr, a distance modulus of 11.50 and a high $E(B - V)$ value of 0.12. Besides the Hobbs et al. (1990) value of $E(B - V) = 0.10$ no other estimation

of the reddening was made until Carraro et al. (1994) paper which yielded values 0.03 and 0.04, depending on the adopted stellar evolution model. The value of age varied from 6 Gyr (Paez et al. 1990, Dinescu et al. 1995) to 7.7 Gyr (Hobbs et al. 1990). Estimations of distance modulus ranged from just a little over 11.0 (Branly et al. 1996) up to 11.5 (Dinescu et al. 1995). The estimated metallicity was always close to solar.

A more recent, high-precision *UBVRI* CCD photometry study by Sarajedini et al. (1999) provided a color-magnitude diagram which extends almost from the red giant branch tip to approximately 5 mag below the main sequence turn-off. The final conclusion was that there is a considerable offset between the photometric zero point of these results and those from Eggen & Sandage (1969), whose photometric scale was used in all previous photometric studies of NGC 188. Reddening $E(B - V)$ was found to be equal to 0.09 ± 0.02 and the distance modulus to be 11.44 ± 0.08 . The metallicity was assumed to be solar, based on the result $[Fe/H] = -0.04 \pm 0.05$ from von Hippel & Sarajedini (1998). The fitted isochrones yielded an age of 7.0 ± 0.5 Gyr. Moreover, the data indicate that there exists a mass segregation with the most massive stars ($M/M_{\odot} > 1.1$) more centrally concentrated comparing to the least massive ones ($0.8 > M/M_{\odot} > 0.65$).

A metallicity for NGC 188 close to solar was verified in Friel et al. (2002), Randich et al. (2003), and Worthey & Jowett (2003). The values of other parameters were revised in three of the most recent papers — VandenBerg & Stetson (2004), Bonatto et al. (2005), and Haroon et al. (2004) — by fitting theoretical isochrones to the color-magnitude diagram. In the first one, after adopting a reddening $E(B - V)$ of 0.087 from Schlegel et al. (1998) dust maps, VandenBerg & Stetson (2004) determined an age of 6.8 Gyr and a distance modulus of 11.40 (distance 1685 pc). In the second of these papers, Bonatto et al. (2005) found a slightly higher age of 7.1 Gyr and a smaller distance modulus of 11.10; their best-fit isochrone indicates $E(B - V) = 0.00$ (which gives a distance of 1660 pc). Finally, both of these age values fall within the range stated in the third paper, Haroon et al. (2004). The results therein indicate an age between 6 and 8 Gyr, more likely close to 8 Gyr. The fitted isochrone yields a distance modulus of 11.26 ± 0.05 . An abnormally high value of reddening, $E(B - V) = 0.17$, lowers the resulting distance down to only 1415 ± 35 pc.

The most recent star catalog for NGC 188 is presented in Stetson et al. (2004). It contains detailed information on more than 9000 stars in the field of the cluster based on all available studies. In addition, half of those stars have revised photometry.

Ernst Paunzen and Jean-Claude Mermilliod's **webda** online open cluster database,⁹ which provides a compilation of data from several sources, currently (August 2006) lists

⁹<http://www.univie.ac.at/webda/webda.html>

the age of NGC 188 as 4.3 Gyr with a distance of 2047 pc, a distance modulus of 11.81, a reddening of $E(B - V) = 0.082$, and a metallicity of $[Fe/H] = -0.02$.

In the following sections of this paper we present details of the instrumentation and observations (§2), data reduction and analysis techniques (§3), isochrones (§4), results (§5), and a summary (§6).

2. Instrumentation and Observations

2.1. $u'g'r'i'z'$ Filter System

The five filters of the $u'g'r'i'z'$ system have effective wavelengths of 3540Å, 4750Å, 6222Å, 7632Å, and 9049Å, respectively, at 1.2 airmasses.¹⁰ They cover the entire wavelength range of the combined atmosphere and CCD response. Their construction is described in Fukugita et al. (1996). The most important characteristics of the $u'g'r'i'z'$ filters and the $u'g'r'i'z'$ magnitude system are outlined in Rider et al. (2004). For a more detailed explanation they refer to Oke & Gunn (1983), Fukugita et al. (1996), and Smith et al. (2002). The $u'g'r'i'z'$ standard star network consists of 158 stars distributed primarily along the celestial equator and the northern celestial hemisphere Smith et al. (2002). Efforts are in place and nearing completion for extending this network both fainter and redder (Smith et al. 2007) and into the southern hemisphere (Smith et al. 2006).

2.2. Telescope and Observations

For this paper, we are using data from the USNO 1.0 m telescope. The observations for NGC 188 were obtained on 2002 November 5 (UT) as part of a four-night observing run. An overview of the observing circumstances is given in Table 2.

All of the observations were direct exposures with a thinned, UV-AR coated, Tektronix TK1024 CCD operating at a gain of $7.43 \pm 0.41 e^- \text{ ADU}^{-1}$ with a read noise of $6.0 e^-$. This CCD is similar to the CCDs used in the SDSS 2.5 m telescope’s imaging camera and the CCD used by the 0.5 m SDSS Photometric Telescope at Apache Point Observatory. This is the detector that defines the $u'g'r'i'z'$ standard star network. The camera scale of $0.^{\circ}68 \text{ pixel}^{-1}$ for this 1024 x 1024 detector produces a field of view of 11.54 arcmin.

¹⁰Note that the g' filter has been determined to have an effective wavelength 20 Å bluer than that originally quoted by Fukugita et al. (1996).

During a typical night at the telescope, we generally observed four to five standard fields at the start of the night to determine the extinction. Following this, we would usually observe two to three target fields and then alternate between two to three standard and target fields through the remainder of the night, finishing with a longer run of standards (usually four to five). In general, two or three standard fields were observed several times each night to monitor extinction manually at the telescope and to look for changes in the photometricity of the sky. These values were compared with the “all-sky” extinction values determined later during reduction process. Additional fields were observed throughout the night, near the meridian and at high air mass, in order to provide a good color spread to solve for instrumental color terms.

3. Data Reduction

We performed reductions using version v8.3 of the SDSS software pipeline `mtpipe` (see, Tucker et al. 2006). This software processes the images and performs aperture photometry. It also determines photometric zero points based on observations of standard star target fields (i.e., stars from Smith et al. 2002) and applies the fitted photometric equations to the aperture photometry lists. A detailed description of `mtpipe` and specific details of how it is used for the open cluster survey can be found in the first paper of this series (Rider et al. 2004). In general, we follow the reduction procedures outlined by Rider et al. (2004) with the following exception — we use an aperture with radius of $7.43''$. This aperture size was chosen because it was used in the calibration of the southern $u'g'r'i'z'$ standard star network (Smith et al. 2003, Smith et al. 2006), and it produced good fits to the photometric equations for the data from the USNO telescope.

The night characterization data for each of the photometric nights included in this study are given in Table 3. These data include the filter (col. [1]), zero points (col. [2]), and the first-order extinction terms (col. [3]). Columns [4] and [5] give the rms errors for, and the number of, the standard stars observed that night which were used in the photometric solutions. In a footnote, we also list the second-order extinction terms derived in Smith et al. (2002).

After running all the data through `mtpipe`, we had four lists of calibrated $u'g'r'i'z'$ photometry for NGC 188 from the USNO 1.0 m telescope. Two of these lists were excluded from further analysis after comparing zeropoint offsets and finding problems in the photometry in at least one filter for these two lists. We combined the contents of the two remaining lists together into a single list. We did the combining by assigning each star in the combined list the “best” magnitude of its corresponding entries from both lists. In this context,

“best” refers to the magnitude that has the smallest photon noise without a saturation flag being set. This was done on a filter-by-filter basis, so a star’s best u' magnitude and best r' magnitude may come from different lists. (Star entries were matched by position between lists using a ± 2 arcsec box in RA and DEC.) Magnitude entries which had been flagged by `mtpipe` as being saturated or which had poorly determined values (magnitudes < 0 or > 100) were excluded from the combine procedure.

Since the `webda` value of NGC 188’s angular diameter is 17.0 arcmin, only stars within a cluster radius of 8.5 arcmin were included in the final list in order to reduce field-star contamination. However, the limiting diameter for NGC 188 appears to be almost three times larger than its `webda` value (see, Bonatto et al. 2005). The same paper shows (see, Fig. 1 of Bonatto et al. 2005) that field-star contamination in the region inside a radius $R = 8.5$ arcmin cannot be neglected. On the other hand, this field is characterized by a high contrast between cluster and background star density (see, Fig. 2 of Bonatto et al. 2005). Anyhow, our analysis, which deals primarily with NGC 188’s fundamental parameters, is not influenced by the facts mentioned above. Where possible, we assigned cluster membership probabilities from Platais et al. (2003); these membership probabilities were based on proper motions given in the same paper. In our analysis, we assumed stars with Platais et al. (2003) membership probabilities over 50% to be cluster members and those with membership probabilities less than 50% to be non-members.

Table 4 provides the available data from the USNO 1.0 m telescope for NGC 188. This table includes our internal ID number for each star (col. [1]), the `webda` star ID number (col. [2]), RA (col [3]), DEC (col. [4]), $u'g'r'i'z'$ magnitudes (cols. [5], [6], [7], [8], & [9], respectively), $u'g'r'i'z'$ magnitude (photon noise) errors (cols. [10], [11], [12], [13], & [14], respectively), $u'g'r'i'z'$ saturation flags (cols. [15], [16], [17], [18], & [19], respectively), the cluster membership probability from Platais et al. (2003) (col. [20]), and comments (col. [21]). Since our data on NGC 188 come only from one telescope, our internal numbering scheme (col. [1]) is just a running ID for the entries in Table 4.

4. Isochrones

We fit the theoretical SDSS isochrones and metallicity curves from Girardi et al. (2004) to our observational data of NGC 188, from where we derive the fundamental parameters of this cluster. The input physics for these models are based upon a Mihalas et al. (1990) equation of state at temperatures $T < 10^7$ K and a fully-ionized gas equation of state at higher temperatures; electron screening is incorporated in the reaction rates. The theoretical evolutionary tracks were converted into the SDSS photometric system using the SDSS

2.5 m telescope *ugriz* filter response functions and the no-overshoot ATLAS9 synthetic atmospheres of Castelli, Gratton, & Kurucz (1997).

Note that the Girardi et al. (2004) SDSS isochrones were created using the SDSS 2.5 m telescope *ugriz* filter system, which differs slightly from the USNO 1.0 m *u'g'r'i'z'* filter system (see, for example Abazajian et al. 2003); furthermore, Girardi et al. (2004) assume that the SDSS 2.5 m *ugriz* system is a perfect *AB* system. In order to compare the isochrones to our data we first had to adjust the isochrones for the known deviation of the SDSS 2.5 m telescope from a true *AB* system. This was done using the following equations (D. Eisenstein, private communication):

$$u(AB, 2.5 \text{ m}) = u(2.5 \text{ m}) - 0.040 , \quad (1)$$

$$g(AB, 2.5 \text{ m}) = g(2.5 \text{ m}) - 0.009 , \quad (2)$$

$$r(AB, 2.5 \text{ m}) = r(2.5 \text{ m}) , \quad (3)$$

$$i(AB, 2.5 \text{ m}) = i(2.5 \text{ m}) + 0.017 , \quad (4)$$

$$z(AB, 2.5 \text{ m}) = z(2.5 \text{ m}) + 0.035 . \quad (5)$$

(The values of the *AB* offsets in these equations are preliminary and future refinement at the $\pm 0.01\text{--}0.02$ mag level are possible.)

Next, the isochrones were converted from the SDSS 2.5 m *ugriz* system into the USNO 1.0 m *u'g'r'i'z'* system by making use of the following relations (Tucker et al. 2006) :

$$u(2.5 \text{ m}) = u' , \quad (6)$$

$$g(2.5 \text{ m}) = g' + 0.060((g' - r') - 0.53) , \quad (7)$$

$$r(2.5 \text{ m}) = r' + 0.035((r' - i') - 0.21) , \quad (8)$$

$$i(2.5 \text{ m}) = i' + 0.041((r' - i') - 0.21) , \quad (9)$$

$$z(2.5 \text{ m}) = z' - 0.030((i' - z') - 0.09) . \quad (10)$$

The stars were then dereddened with the following equations, which make use of the extinction coefficients given by Girardi et al. (2004) for $A_V = 1.0$, $R_V = 3.1$, and $T_{eff} = 5777$ K:

$$u' = u'_{red} - 4.879 \times E(B - V) , \quad (11)$$

$$g' = g'_{red} - 3.708 \times E(B - V) , \quad (12)$$

$$r' = r'_{red} - 2.722 \times E(B - V) , \quad (13)$$

$$i' = i'_{red} - 2.089 \times E(B - V) , \quad (14)$$

$$z' = z'_{red} - 1.519 \times E(B - V) . \quad (15)$$

5. Results

We initially adopted the current (August 2006) **webda** values for distance, age, reddening $E(B-V)$, and metallicity $[Fe/H]$ as a first guess for these parameters for NGC 188. Figure 1 shows the color-magnitude diagram for our set of data points overplotted with the theoretical isochrones which bracket the **webda** value of age for NGC 188. Figure 2 shows the same comparison on the color-color diagram.

These isochrones do not fit our data. There is no match, especially for the red giant branch. We therefore attempted to find the best fitting theoretical isochrone by fitting the data by eye. We decided that the best way of doing this would be to reduce as much as possible the number of unknown cluster parameters. The **webda** states NGC 188's metallicity as $[Fe/H] = -0.02$. All the latest papers also indicate that its value is close to zero: -0.02 (Twarog et al. 1997), -0.04 (von Hippel & Sarajedini 1998), -0.10 (Friel et al. 2002), 0.00 (Randich et al. 2003), 0.075 (Worley & Jowett 2003). Apart from that, we noticed that change in metallicity $[Fe/H]$ of the order of 0.4 dex doesn't influence the shape of the Girardi isochrone by large amount. We therefore assumed a solar metallicity for NGC 188. We were then left with three free parameters. Since a change in distance shifts the isochrone on the color-magnitude diagram only up and down, we would be able to fit the isochrone easily after determining the value of age or reddening $E(B-V)$ in an independent way. We decided to do this for the reddening.

From the color-color diagram we were able to infer the value of reddening $E(B-V)$ by comparing our data points corrected for the reddening with the theoretical predictions for the main sequence isochrone on the color-color diagram for our set of filters. In order to analyze only the main sequence stars and eliminate red giants, we took into consideration stars with magnitudes higher than 15 and lower than 17 mag. We over-plotted these data points with the theoretical curves of the $(g' - r')$ vs. $(u' - g')$ dependence for the Zero Age Main Sequence (ZAMS) stars. The $U - B$ and $B - V$ values for the ZAMS were taken from Table 3.9 of Binney, J., Merrifield, M. "Galactic Astronomy". The $g' - r'$ and $u' - g'$ values were calculated using the transformation equations from Karaali et. al. (2005). Figure 3 shows the result obtained for the **webda** value of reddening $E(B-V) = 0.082$.

The theoretical curve seems to match the data points quite well, but this was not the best fit. The best fit of the theoretical ZAMS curve to the data points was obtained for $E(B-V) = 0.025$ (Figure 4), which is noticeably different from the **webda** value.

Having fixed the values of reddening $E(B-V)$ and metallicity $[Fe/H]$, fitting the theoretical isochrone to our color-magnitude data points became straightforward. First, we chose the age for which the fitted isochrone had the same color of the turn-off as our data

points. Then, by shifting the isochrone up and down (changing the distance), we finally obtained the best fit.

Based upon the Girardi et al. (2004) isochrones we find that the cluster data are consistent with a distance of 1700 ± 100 pc, an age in the range of 6.8 to 8.2 Gyr, and a reddening $E(B - V)$ between 0.020 and 0.030; however, we find that a distance of 1700 pc, an age of 7.5 Gyr, and a reddening $E(B - V)$ of 0.025 best fit our data (Figure 5). These values yield a distance modulus of 11.23 ± 0.14 . The corresponding isochrone fits on the color-color diagram are shown in Figure 6.

We do note that we have emphasized the g' vs. $(g' - r')$ in our fits, and that the other diagrams could be better fit by choosing slightly different parameters. The slight discrepancies in the best-fit parameters among these diagrams are within the uncertainties of the isochrones and the AB offsets. Each of the color-magnitude diagrams and the color-color diagrams (Figures 7 and 8) has an over-plotted isochrone closest to the one for our best fit values from above. The bold portion of the isochrone represents the region in which the $ugriz$ to $u'g'r'i'z'$ transformations are best characterized (Rider et al. 2004).

Figures 7(a-f) show the full set of color-magnitude diagrams available in the $u'g'r'i'z'$ filter system for NGC 188. The g' vs. $(g' - r')$ (Figure 7b) and the r' vs. $(g' - r')$ (Figure 7c) color-magnitude diagrams are most similar to the more recognizable V vs. $(B - V)$ color-magnitude diagrams (see, e.g., Karaali et. al. 2005 and Rodgers et al. 2006 for the transformation equations between the $u'g'r'i'z'$ and the Johnson $UBVR_cI_c$ photometric systems). The main sequence and main sequence turn-off are best defined in the g' vs. $(g' - r')$ diagram.

Figures 8(a-c) show the three color-color diagrams of the $u'g'r'i'z'$ filter system. The $(u' - g')$ vs. $(g' - r')$ (Figure 8a) color-color diagram is most similar to the more common $(U - B)$ vs. $(B - V)$ color-color diagram.

As noted above, the values of distance, age, and reddening $E(B - V)$, which we have determined for NGC 188, are not consistent with the `webda` catalog values for this cluster, even within the errors given. The age differs by 75%, the distance by 15%, and the reddening by 70% ($\Delta E(B - V) = 0.057$). Such differences in measured values for these cluster parameters are not uncommon (see, Fig. 2 of Paunzen & Netopil 2006). Furthermore, the values of age and distance agree within the errors given with the most recent results for NGC 188 (Bonatto et al. 2005, VandenBerg & Stetson 2004, Sarajedini et al. 1999), except for the distance presented in Haroon et al. (2004), which is considerably smaller than ours and all other modern estimates. Our value of reddening $E(B - V)$ is close only to the value obtained by Bonatto et al. (2005) and Carraro et al. (1994), while substantially different from

the values presented in Haroon et al. (2004), VandenBerg & Stetson (2004) or Sarajedini et al. (1999). Since Bonatto et al. (2005), like us, use the Padova isochrones (Girardi et al. 2002, Girardi et al. 2004), and since Haroon et al. (2004), VandenBerg & Stetson (2004) and Sarajedini et al. (1999) use the VandenBerg (VandenBerg 1985), VandenBerg (VandenBerg 2006) and Yale (Chaboyer et al. 1992, Green et al. 1987) isochrones, respectively, we suspect the differences are in part due to the isochrones themselves. In fact, in an important study by Grocholski & Sarajedini (2003), they compared several sets of theoretical isochrones and found that none of them reproduced the observed multi-band photometry of open clusters in a fully consistent manner, at least over the magnitude and color range of the non-evolved main sequence. For data in the SDSS filter systems, we are unfortunately confined to just the Padova isochrones, as no other sets of theoretical isochrones in the SDSS system have become publicly available and current versions of $UBVRI \rightarrow u'g'r'i'z'$ transformation equations are still uncertain at the few percent level.

6. Summary and Discussion

In this third paper of our series, we have analyzed the $u'g'r'i'z'$ photometry of the open cluster NGC 188. Assuming a solar metallicity, we were able to determine a distance of 1700 ± 100 pc, an age of 7.5 ± 0.7 Gyr, and a reddening of $E(B - V) = 0.025 \pm 0.005$.

Our fits turn out to give results which are not consistent with the values for these parameters found in the `webda` on-line open cluster catalog. In particular, our value for $E(B - V)$ is noticeably smaller. Nevertheless, our results for the age and distance agree well with these parameters' values from the most recent studies of NGC 188: 7.1 Gyr and 1660 pc (Bonatto et al. 2005), 6.8 Gyr and 1685 pc (VandenBerg & Stetson 2004), 7 Gyr and 1710 (Sarajedini et al. 1999). Although our reddening $E(B - V)$ is neither consistent with 0.087 (VandenBerg & Stetson 2004) nor 0.09 (Sarajedini et al. 1999), it stays in good agreement with 0.03 (Carraro et al. 1994) and is relatively close to 0.00 (Bonatto et al. 2005). This is very positive since a reddening of $E(B - V) = 0.087$ stated in VandenBerg & Stetson (2004) was taken from the COBE/DIRBE reddening maps by Schlegel et al. (1998) and thus this would represent an upper limit to the amount of reddening in the line-of-sight to NGC 188. The Schlegel et al. (1998) maps are also very uniform over the area of NGC 188; therefore, we cannot blame differential reddening over the NGC 188 field as a cause for the different estimates for the reddening.

Summarizing, there is a discrepancy between the `webda` parameters' values for NGC 188 and our results for this cluster. Nevertheless, the theoretical Padova isochrone on the g' vs. $(g' - r')$ diagram, plotted for our set of values, matches the data points very well, precisely

restoring the red giant branch. Furthermore, our ZAMS theoretical curve fit to the main sequence stars' data points on the color-color diagram looks very reliable.

However, there is some probability that the transformation equations leading from the UBV set of filters to our $u'g'r'i'z'$ filter system are not precise, and this could be the reason our value of reddening $E(B - V)$ might not be exact. In fact, a preliminary version of a new $u'g'r'i'z'$ ZAMS being developed by one of us (HS; Sung et al. 2006) tends to indicate a value of $E(B - V)$ more in line with the current `webda` value of 0.082. This bears further investigation. In addition, the fact that our results are different than `webda` values might also be caused by using a different set of theoretical isochrones to fit the data points. The likelihood of this scenario becomes even more probable when one considers that the only other recent study to give such a low value of $E(B - V)$ for this cluster is that of Bonatto et al. (2005), who also used the Padova isochrones (but for J and H 2MASS photometry). One has to check this issue very carefully.

Since NGC 188 is one of the oldest open clusters known, it is a strategic objective in understanding the chemical evolution of the Galaxy. It is therefore extremely important that all the discrepancies between the values of NGC 188's parameters be explained.

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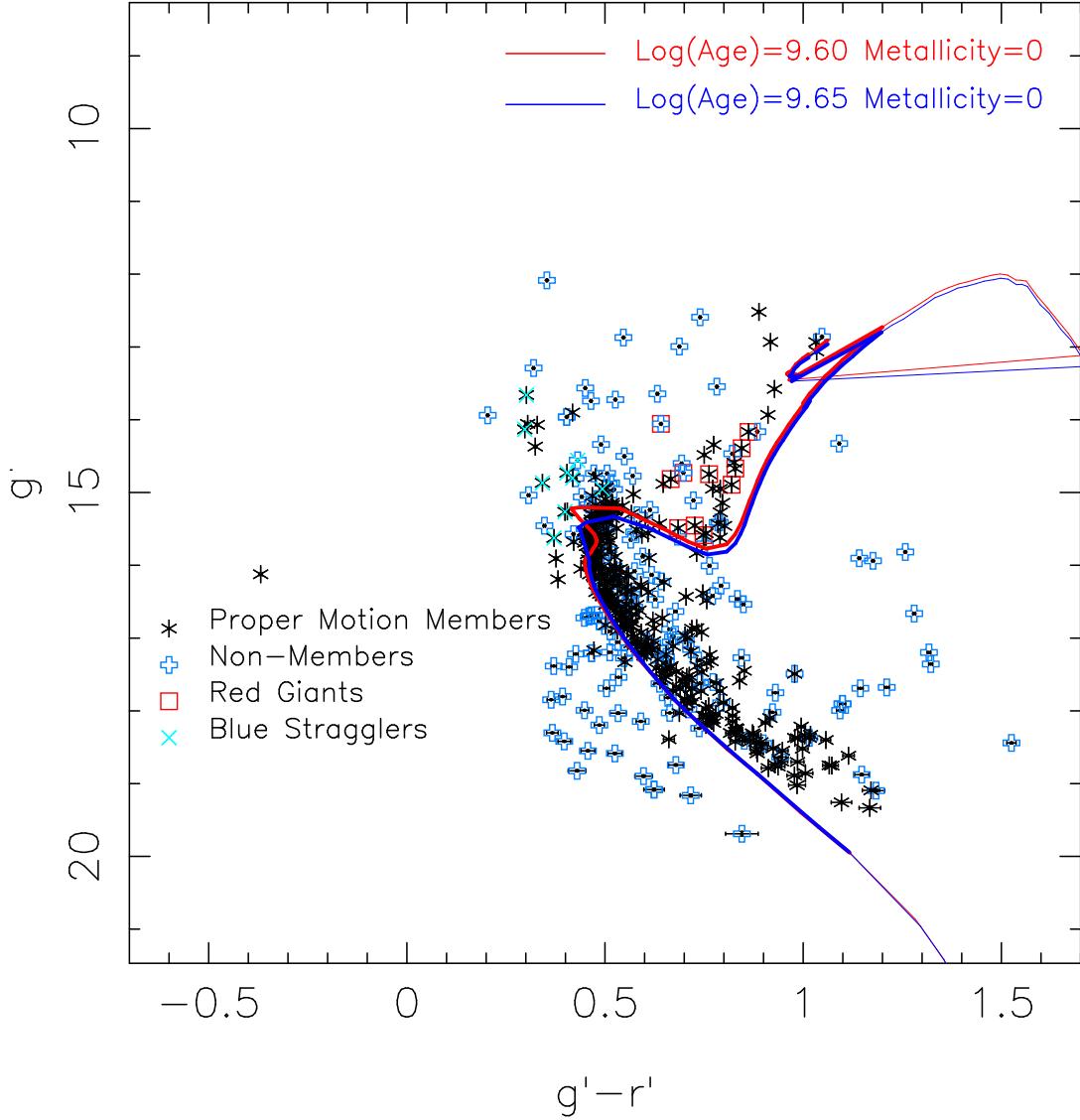


Fig. 1.— The observed (not dereddened) g' vs. $(g' - r')$ color-magnitude diagram for NGC 188 using data from the USNO 1.0 m telescope. The solid lines are the 4.0 and 4.5 Gyr isochrones (distance 2047 pc, $E(B - V) = 0.082$, $[Fe/H] = 0.0$) from Girardi et al. (2004) which bracket the `webda` value of 4.3 Gyr. Stars identified as cluster members based upon their Platais et al. (2003) proper motion membership probabilities (probability $>50\%$) are indicated by asterisks; those identified as non-members (probability $<50\%$), by thick plus signs. Those stars classified in `webda` as red giants or as blue stragglers are marked by square symbols or by \times symbols, respectively.

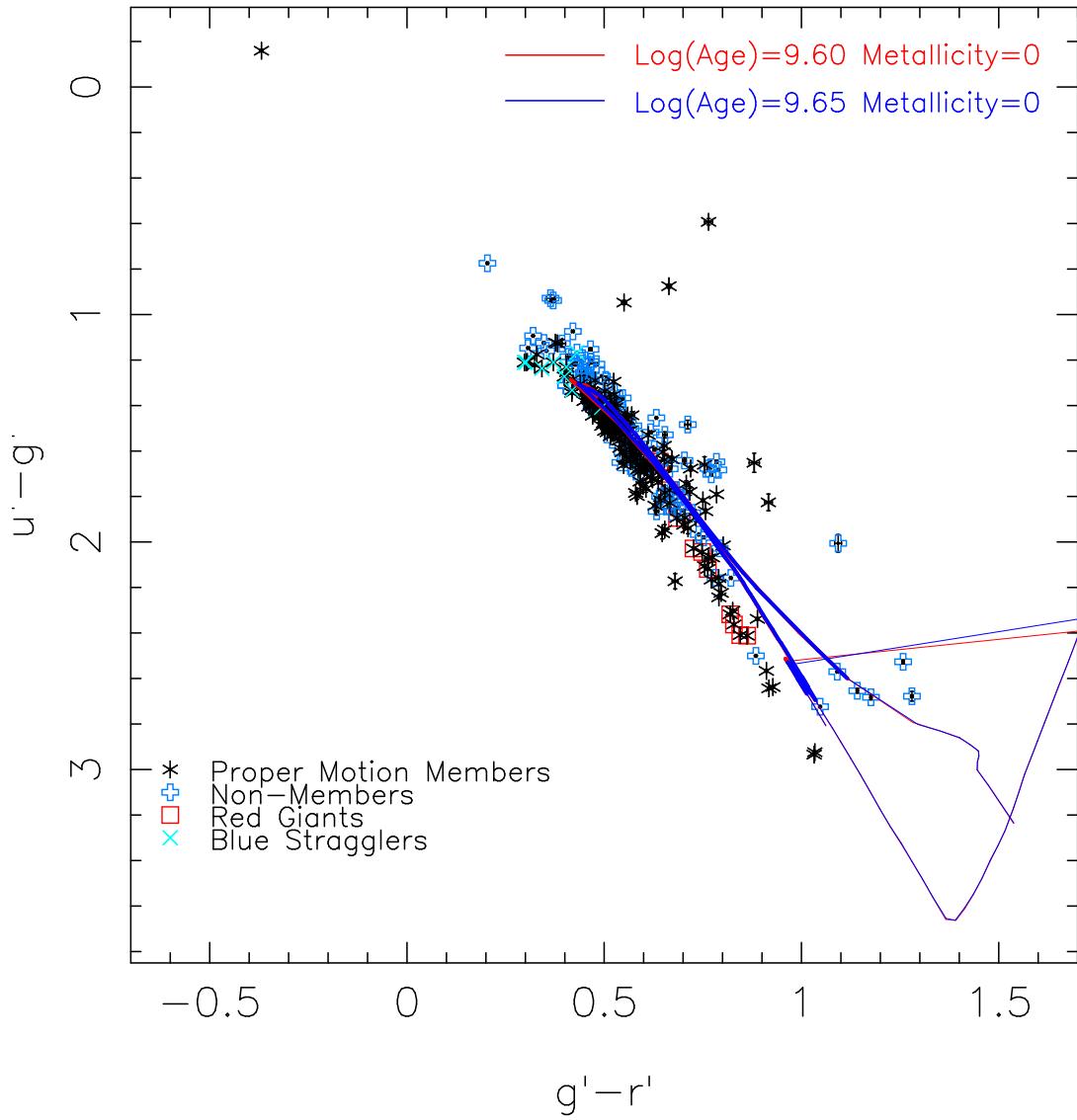


Fig. 2.— The observed (not dereddened) $(u' - g')$ vs. $(g' - r')$ color-color diagram for NGC 188 using data from the USNO 1.0 m telescope. The solid lines are the 4.0 and 4.5 Gyr isochrones (distance 2047 pc, $E(B - V) = 0.082$, $[Fe/H] = 0.0$) from Girardi et al. (2004) which bracket the `webda` value of 4.3 Gyr. The symbols are the same as in Fig. 1.

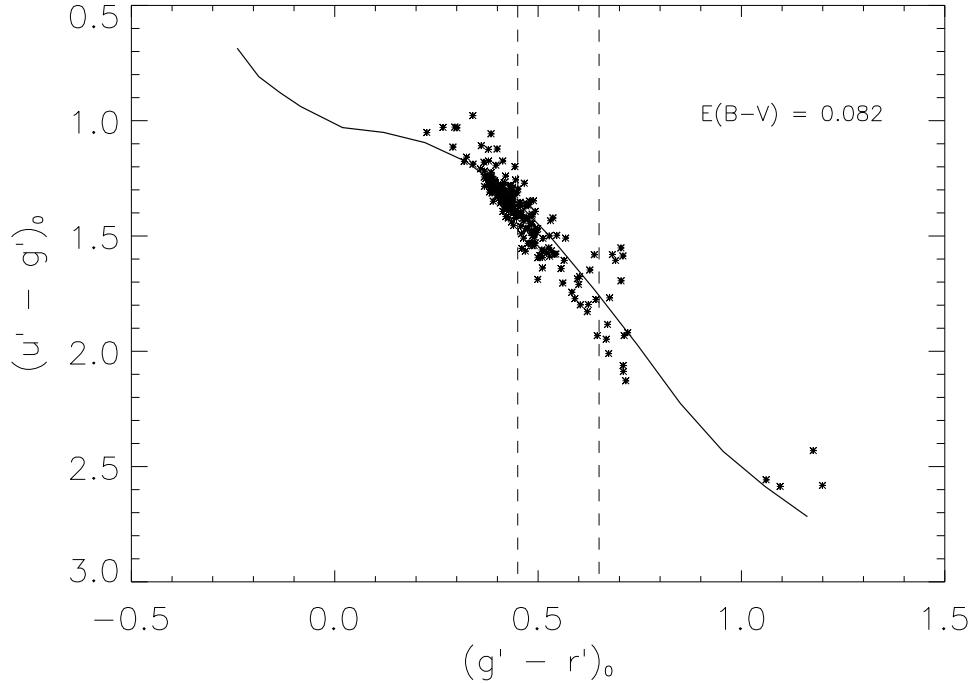


Fig. 3.— The dereddened $(u' - g')_0$ vs. $(g' - r')_0$ color-color diagram (assuming `webda` value of $E(B - V) = 0.082$) for NGC 188's main sequence stars using data from the USNO 1.0 m telescope. The solid curve is the theoretical Zero Age Main Sequence curve obtained after applying the transformation equations from Karaali et. al. (2005) to the $U - B$ and $B - V$ values for the ZAMS taken from Table 3.9 of Binney, J., Merrifield, M. "Galactic Astronomy". The two vertical dashed lines represent the main sequence band between $(g' - r')_0 = 0.45$ and 0.65 , which is the region where the data and ZAMS should fit best.

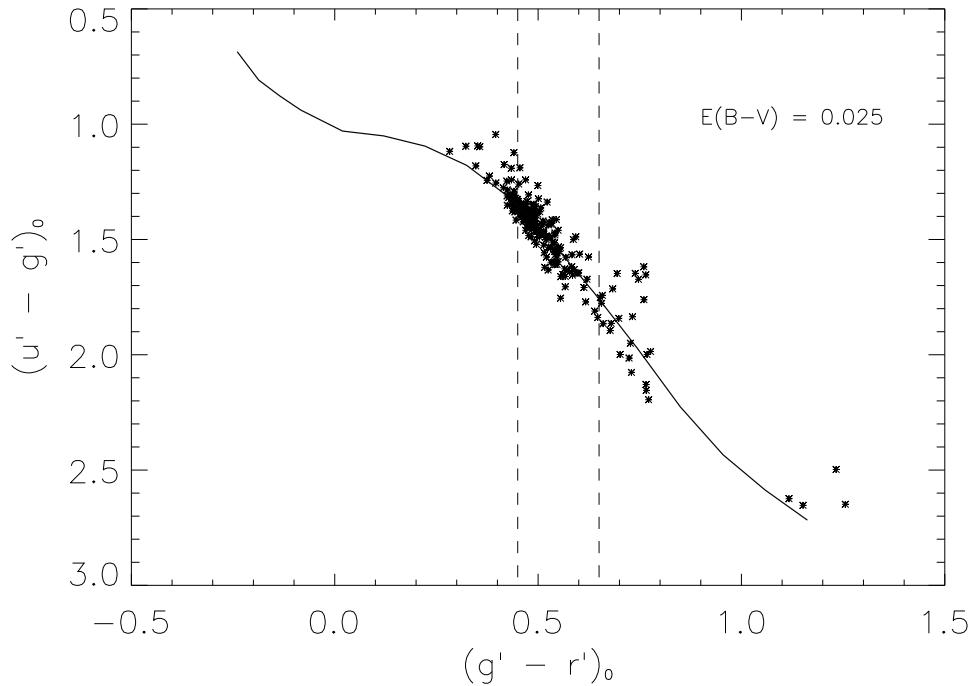


Fig. 4.— The dereddened $(u' - g')_0$ vs. $(g' - r')_0$ color-color diagram (assuming $E(B - V) = 0.025$) for NGC 188's main sequence stars using data from the USNO 1.0 m telescope. The solid curve and dashed lines are as in Figure 3.

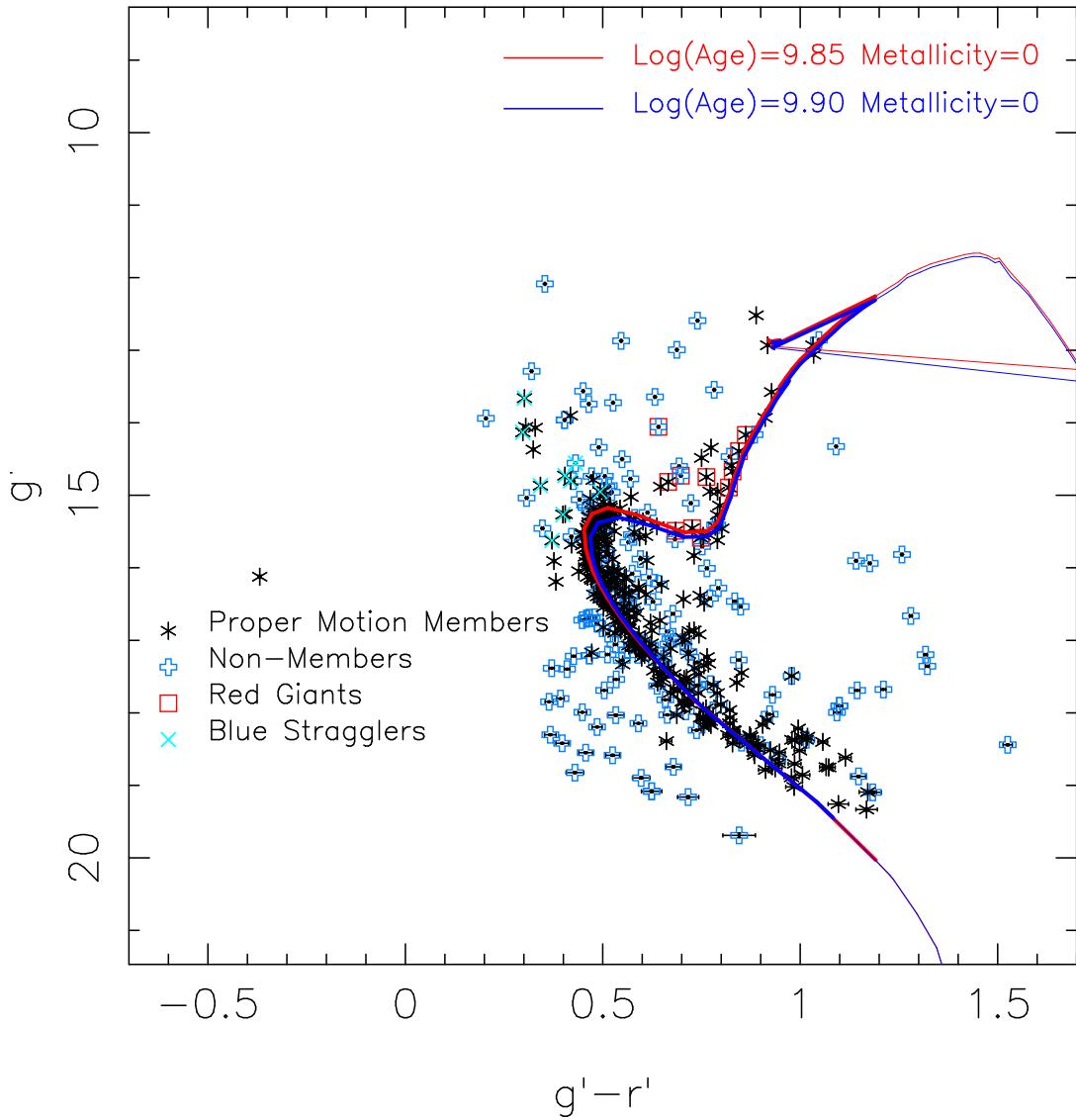


Fig. 5.— The observed (not dereddened) g' vs. $(g' - r')$ color-magnitude diagram for NGC 188 using data from the USNO 1.0 m telescope. The solid lines are the 7.1 and 7.9 Gyr isochrones (distance 1700 pc, $E(B - V) = 0.025$, $[Fe/H] = 0.0$) from Girardi et al. (2004) which bracket our value of 7.5 Gyr. The symbols are the same as in Fig. 1. This time a much better isochrone fit is obtained than for the webda values. Even the red giant branch is precisely restored.

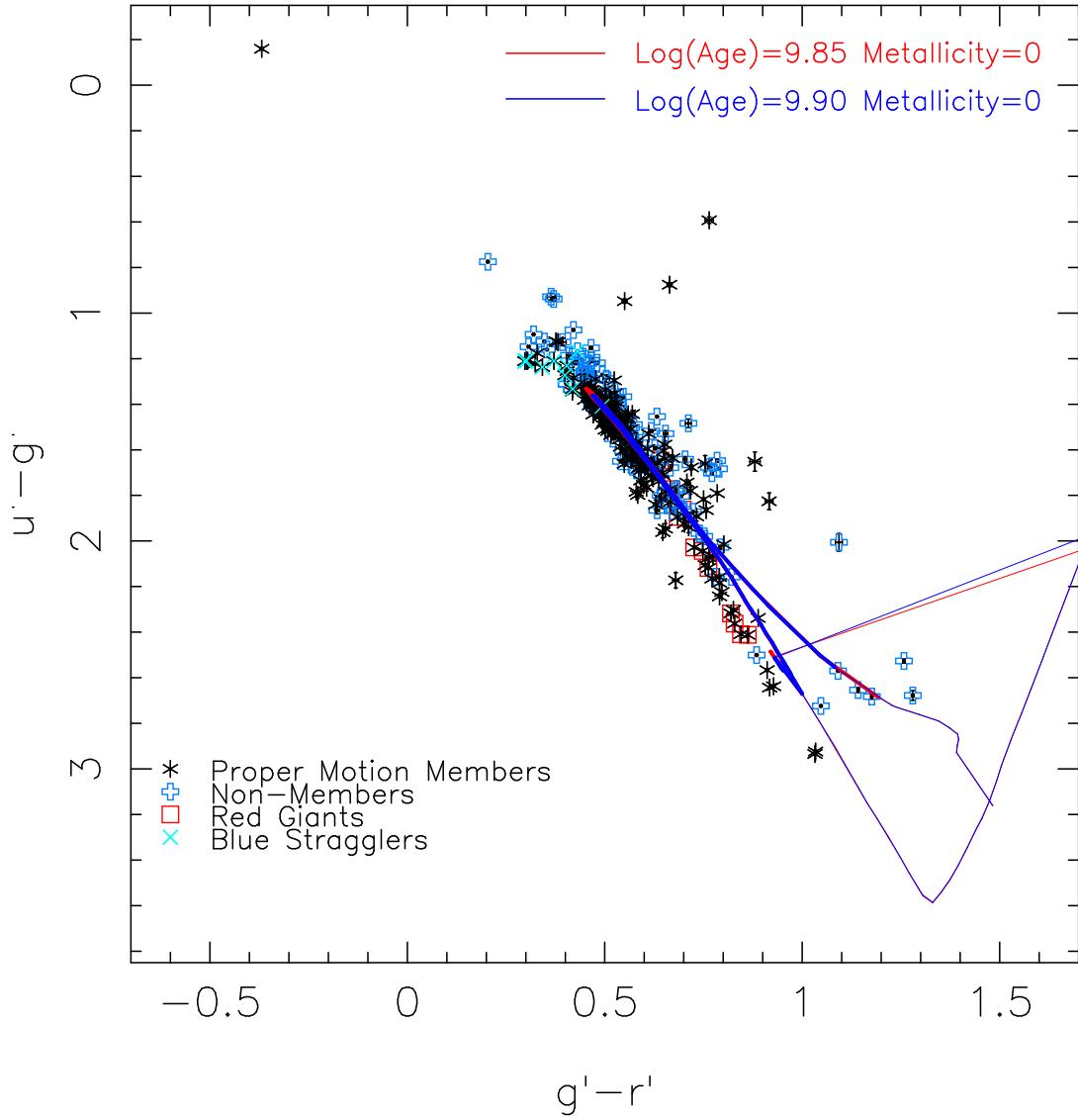


Fig. 6.— The observed (not dereddened) $(u' - g')$ vs. $(g' - r')$ color-color diagram for NGC 188 using data from the USNO 1.0 m telescope. The solid lines are the 7.1 and 7.9 Gyr isochrones (distance 1700 pc, $E(B - V) = 0.025$, $[Fe/H] = 0.0$) from Girardi et al. (2004) which bracket our value of 7.5 Gyr. The symbols are the same as in Fig. 1.

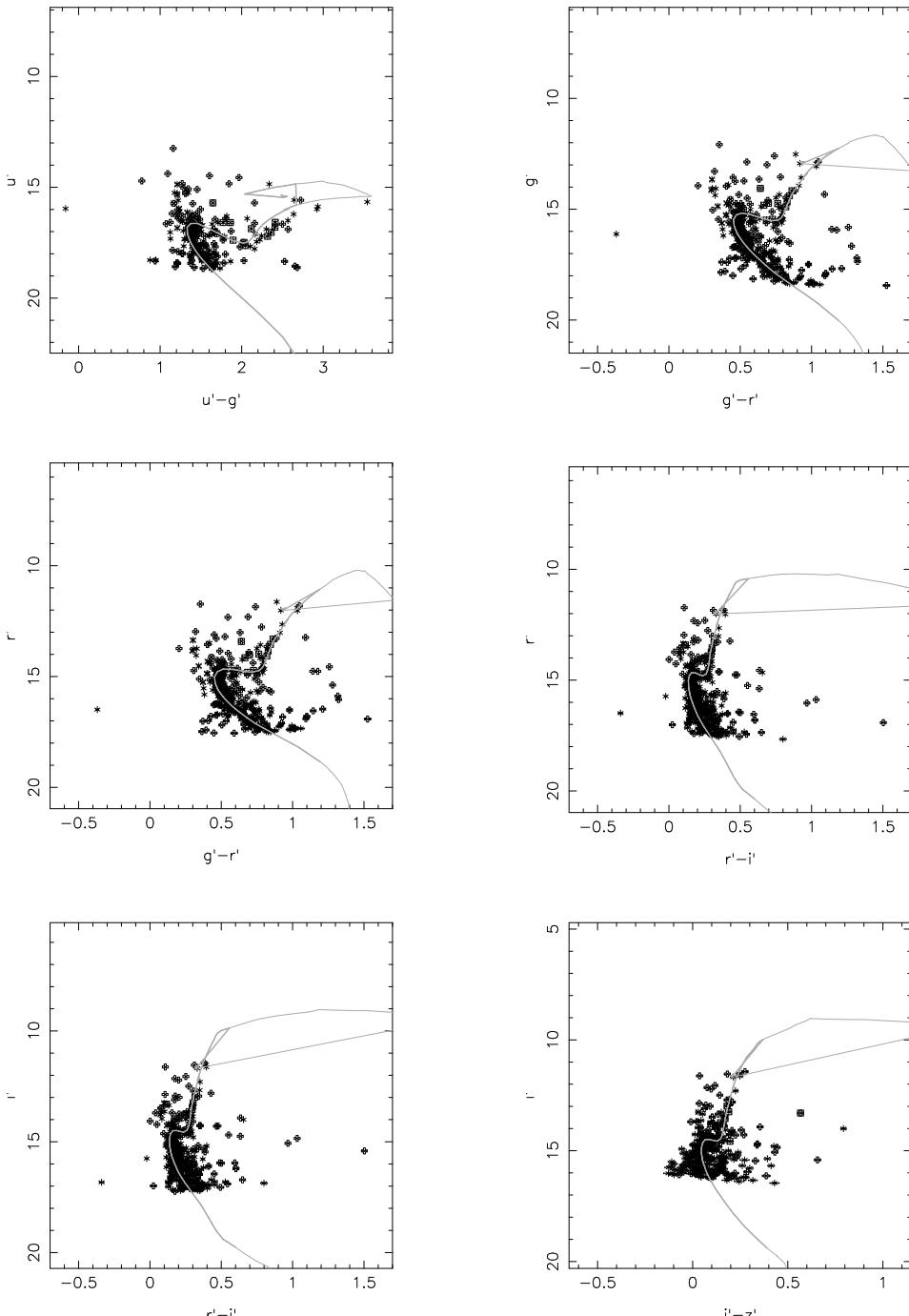


Fig. 7.— The observed (not dereddened) color-magnitude diagrams for NGC 188 using data from the USNO 1.0 m telescope. To reduce contamination from field stars, only stars with estimated photon noise errors in the colors less than 0.05 mag are included (typically stars brighter than $g' \approx 15$). For clarity, we plotted only the 7.1 Gyr isochrone (distance 1700 pc, $E(B-V) = 0.025$, $[Fe/H] = 0.0$) from Girardi et al. (2004). The symbols are the same as in Fig. 1 (i.e., asterisks denote proper motion members, thick plus signs indicate non-members, squares are red giants, and \times signs are blue stragglers); for clarity, the legend key has been omitted from the figures.

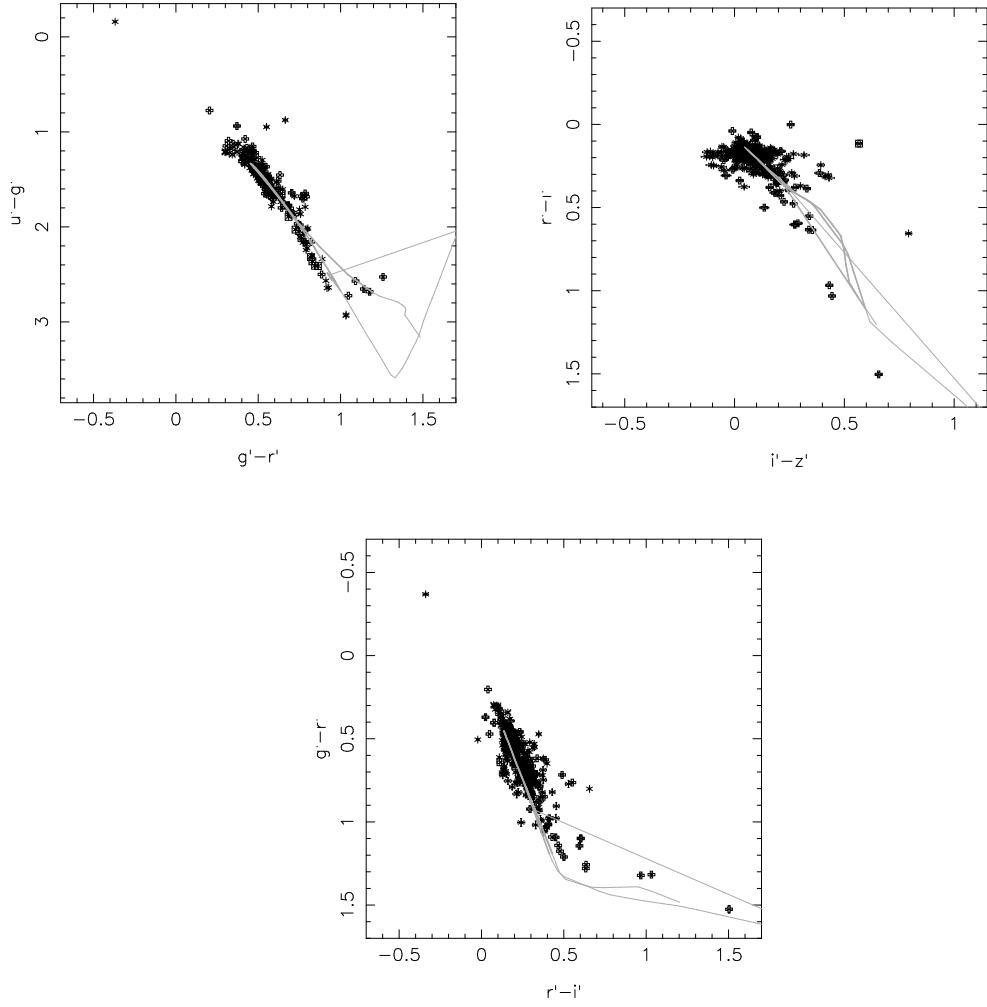


Fig. 8.— The observed (not dereddened) color-color diagrams for NGC 188 using data from the USNO 1.0 m telescope. To reduce contamination from field stars, only stars with estimated photon noise errors in the colors less than 0.05 mag are included (typically stars brighter than $g' \approx 15$). For clarity, we plotted only the 7.1 Gyr isochrone (distance 1700 pc, $E(B - V) = 0.025$, $[Fe/H] = 0.0$) from Girardi et al. (2004). The symbols are the same as in Fig. 1.

Table 1. NGC 188 parameter values

Reference	Distance modulus (distance ^a [pc])	Age [Gyr]	$E(B-V)$ [mag]	$[Fe/H]$	Technique
Sandage 1962a	10.95 (1440)	-	0.05 ± 0.02	-	spectral analysis of classification standards
Sandage 1962b	-	14 – 16 9 – 10	-	-0.20 ^{b,n}	isochrone fits (Hoyle 1959)
Demarque & Larson 1964	-	-	0.18 ± 0.03	0.33 ^{c,n}	isochrone fits (Larson & Demarque 1964)
Greenstein & Keenan 1964	-	11 ± 2	-	-	isochrone fits
Iben 1967	-	7.0 10	-	0.70 ^{d,n}	isochrone fits (Larson & Demarque 1964)
Demarque & Schlesinger 1969	10.85 ± 0.15 (1305 ± 90) ^e	8 – 10	0.09	0.07	UBV photometry
Elgen & Sandage 1969	-	4.6	-	-	isochrone fits
Sandage & Elgen 1969	-	5.5	0.10	0.34 (adopted) ^{f,n}	graphical technique
Aizenman et al. 1969	-	-	0.10	0.69 (adopted) ^{g,n}	graphical technique
Spinrad et al. 1970	-	-	0.15	0.6 ^h	scanner observation of strong lines
Torres-Peimbert 1971	11.1 ± 0.2 (1650)	3.6	0.15 (adopted)	-	isochrone fits
Pagel 1974	-	-	0.09 (adopted)	0.66 ⁱ	analysis of CN blocking fractions
McClure 1974	-	-	0.07 ± 0.02 ^j	0.04 ± 0.10	DDO photometry
Jennens & Helfer 1975	12.0 (2375)	8 (adopted)	0.04	-0.6	$UBVriz$ photometry
Saio et al. 1977	10.85 ± 0.15 (1305 ± 90) (adopted)	8 ± 1 4.3 ± 1.0	0.09 (adopted) 0.09 (adopted)	0.00 (adopted) 0.06 (adopted)	isochrone fits
Twarog 1978	11.48 ^k (1745)	-	-	-	analysis of the giant branch
Paternaude 1978	10.8 (1275) (adopted)	8.0	0.09 (adopted)	0.31 ^l	isochrone fits
Janes 1979	10.90 (adopted)	-	0.07 (adopted)	-0.18 ± 0.09	UBV photometry
Twarog 1983	11.3 ± 0.2	-	-	-	PDS photometry
Barbaro & Pigatto 1984	10.85 (1305) (adopted)	9	0.09 (adopted)	-	isochrone fits
VandenBerg 1985	11.1 (1485)	10.0	0.08	0.00	isochrone fits
Adler & Rood 1985	-	10 ± 1	-	0.00 (adopted)	isochrone fits
Cantenna et al. 1986	-	-	0.08 (adopted)	-0.05 ^h	Washington photometry
Twarog & Anthony-Twarog 1989	11.50 (1690)	6.5 ± 0.5 6.0 ± 1.0	0.12 0.12 (adopted)	0.0 (adopted) 0.02 ± 0.11 (adopted)	isochrone fits
Ceputo et al. 1990	11.50 (1690) (adopted)	7.7 ± 1.4	0.10 (± 0.03)	-0.12 ± 0.16	high-resolution spectral analysis
Hobbs et al. 1990	-	-	-	-	of turnoff stars
Paez et al. 1990	11.05 (1375)	6	0.12 (adopted)	-	CCD photometry
Demarque et al. 1992	-	6.5(+1.5/-0.5)	-	-	Cox-Stewart and LACL opacities
Carriero et al. 1994	11.30 (1720)	7.0	0.04	0.14 ^{m,n}	classical models
Dinescu et al. 1995	11.25 (1705)	7.5	0.03	0.14 ^{m,n}	models with overshoot
Branly et al. 1996	11.5 ± 0.1 (1690 ± 80)	6(+1/-0.5)	0.12 (adopted)	0.0 (adopted)	isochrone fits
Twarog et al. 1997	11.014 ± 0.057 (1430 ± 40) ^j	-	0.08 (adopted)	-	method of eclipsing binaries
Sarajedini & Sarajedini 1998	11.049 ± 0.055 (1375 ± 35) ^j	-	0.12 (adopted)	-	method of eclipsing binaries
von Hippel & Sarajedini 1999	11.35 (1645) (adopted)	-	0.09 (adopted) ^p	-0.02	DDO photometry
Friel et al. 2002	11.43 ± 0.08 (1705 ± 65)	7.0 ± 0.5	0.09 ± 0.02	-0.04 ± 0.05 ^j	V - and I -band photometry
Randich et al. 2003	11.44 ± 0.08 (1710 ± 70)	-	0.08 (adopted)	0.00 (adopted)	$UBVRI$ CCD photometry, Yale isochrone fits
Andreuzzi et al. 2002	-	-	-	-0.10	moderate resolution spectroscopy
Worthey & Iovett 2003	-	lower limit of 5	-	0.00	Li survey
VandenBerg & Skjetson 2004	11.40 (1685)	6.8	0.087 (adopted) ^r	0.075 ± 0.045 ± syst ^a	white dwarf luminosity function
Haroot et al. 2004	11.26 ± 0.05 (1415 ± 35)	6 – 8 (closer to 8)	0.17	-	analysis of low-resolution spectra of K giants
Bonatto et al. 2005	11.1 ± 0.1 (1660 ± 80)	7.1 ± 1.0	0.00	-	VandenBerg isochrone fits ^s
webda (August 2006)	11.81 (2047)	4.3	0.082	-0.02	$BVRI$ CCD photometry
This work	11.23 ± 0.14 (1700 ± 100)	7.5 ± 0.7	0.025 ± 0.005	0.00 (adopted)	J and H 2MASS photometry,
					Girardi isochrone fits
					$ugriz'$ photometry, Girardi isochrone fits

^acalculated from distance modulus after applying a correction of $3.0 \times E(B-V)$ ^bresult for $X = 0.75$, $Z = 0.01$ ^cresult for $X = 0.67$, $Z = 0.03$ ^dresult for $X = 0.67$, $Z = 0.07$ ^edistance modulus based on the Hyades distance modulus of 3.03^fresult for $X = 0.65$, $Z = 0.03$ ^gresult for $X = 0.59$, $Z = 0.06$ ^hassumed a solar mixture of heavy elements, i.e. $[M/H] = [Fe/H]$

Table 2. Observing Circumstances

Date	MJD	Airmass	Exposure (sec)					Comments
			r'	g'	u'	i'	z'	
2002 Nov 05	52583	1.558	10	10	70	10	15	Non-Photometric
		1.559	60	60	420	60	90	Photometric
		1.563	240	240	1680	240	360	Photometric
		1.578	10	10	70	10	15	Non-Photometric

Table 3. Night Characterization Coefficients^a for MJD 52583

Filter	Zeropoint (a)	1st-Order Ext. (k)	Std. rms (mag)	# Std. stars
(1)	(2)	(3)	(4)	(5)
u'	-20.088±0.032	0.470±0.022	0.027	22
g'	-21.658±0.011	0.152±0.008	0.012	27
r'	-21.502±0.011	0.081±0.007	0.012	27
i'	-21.083±0.016	0.036±0.011	0.016	26
z'	-19.928±0.026	0.005±0.017	0.026	27

^aThe values for the second order extinction term (c) coefficients were set to -2.1×10^{-2} , -1.6×10^{-2} , -4.0×10^{-3} , 6.0×10^{-3} and 3.0×10^{-3} , for the u', g', r', i' and z' respectively. The values for the Instr. Color (b) were all set to zero. These values are those determined in Smith et al. (2002).

Table 4. Available Data from the USNO 1.0 m Telescope for NGC 188

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
99	2111	00:49:24.28	85:15:53.	18.621	15.939	14.763	14.286	14.017	0.022	0.004	0.003	0.004	0.014	0	0	0	0	0	0	0	0	0	0
100	2084	00:47:19.49	85:17:35.	16.709	15.269	14.765	14.588	14.518	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
101	1039	00:47:28.7	85:12:27.	16.781	15.287	14.767	14.582	14.534	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
102	1091	00:47:41.26	85:13:45.	16.695	15.262	14.789	14.607	14.526	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	96
103	2153	00:48:52.68	85:12:08.	16.705	15.266	14.775	14.601	14.561	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
104	-1	00:44:59.99	85:15:35.	16.666	15.280	14.785	14.603	14.531	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
105	-1	00:51:53.30	85:09:58.	17.164	15.426	14.789	14.553	14.469	0.007	0.004	0.003	0.005	0.014	0	0	0	0	0	0	0	0	0	98
106	2096	00:49:53.34	85:17:41.	16.749	15.305	14.791	14.607	14.561	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
107	-1	00:44:52.31	85:10:24.	17.665	15.559	14.804	14.525	14.384	0.010	0.004	0.003	0.005	0.014	0	0	0	0	0	0	0	0	0	97
108	1088	00:48:37.06	85:13:18.	17.384	15.490	14.805	14.557	14.469	0.008	0.004	0.003	0.005	0.014	0	0	0	0	0	0	0	0	0	95
109	-1	00:45:35.15	85:17:04.	16.731	15.312	14.810	14.616	14.541	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
110	-1	00:51:28.65	85:13:32.	16.716	15.303	14.811	14.638	14.527	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
111	-1	00:52:38.54	85:11:00.	16.691	15.304	14.813	14.627	14.521	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
112	1076	00:46:40.52	85:14:40.	16.723	15.313	14.824	14.647	14.559	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
113	-1	00:49:28.18	85:11:25.	16.612	15.292	14.827	14.657	14.555	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
114	-1	00:52:16.14	85:13:44.	16.751	15.321	14.829	14.657	14.550	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
115	-1	00:44:02.96	85:11:41.	17.778	15.620	14.830	14.536	14.367	0.011	0.004	0.003	0.005	0.014	0	0	0	0	0	0	0	0	0	94
116	-1	00:45:37.89	85:18:37.	16.730	15.327	14.830	14.657	14.556	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	92
117	1030	00:48:16.41	85:16:46.	16.798	15.351	14.833	14.650	14.504	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	85
118	2133	00:51:10.63	85:14:28.	16.659	15.297	14.833	14.663	14.569	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	89
119	1042	00:46:49.95	85:17:06.	17.630	15.556	14.834	14.754	14.378	0.010	0.004	0.003	0.005	0.014	0	0	0	0	0	0	0	0	0	97
120	4665	00:49:37.00	85:16:38.	16.514	15.260	14.855	14.730	14.636	0.004	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
121	1043	00:46:23.06	85:17:13.	16.539	15.246	14.867	14.748	14.688	0.004	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
122	2107	00:49:00.56	85:16:24.	16.777	15.360	14.873	14.707	14.655	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
123	-1	00:47:17.78	85:09:47.	16.819	15.386	14.894	14.748	14.564	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
124	4584	00:47:50.60	85:15:43.	16.812	15.386	14.894	14.748	14.564	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
125	-1	00:44:27.48	85:14:10.	16.842	15.349	14.896	14.722	14.718	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
126	1045	00:46:03.31	85:16:56.	16.756	15.374	14.898	14.739	14.730	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
127	1037	00:47:36.77	85:16:24.	16.809	15.414	14.949	14.820	14.754	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
128	-1	00:46:01.26	85:18:17.	16.760	15.375	14.902	14.716	14.666	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
129	-1	00:44:59.40	85:11:50.	16.709	15.370	14.905	14.738	14.739	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
130	-1	00:45:13.13	85:13:29.	16.736	15.385	14.916	14.768	14.725	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
131	-1	00:51:18.56	85:17:44.	17.379	15.608	14.925	14.645	14.497	0.008	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
132	1037	00:47:17.78	85:16:41.	17.294	15.510	14.930	14.753	14.681	0.007	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	96
133	1017	00:47:17.89	85:15:12.	16.809	15.414	14.949	14.820	14.754	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
134	-1	00:52:15.68	85:14:44.	16.812	15.447	14.950	14.768	14.653	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
135	-1	00:45:04.30	85:13:59.	17.157	15.561	14.953	14.745	14.654	0.007	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	85
136	-1	00:51:16.06	85:09:47.	17.685	15.705	14.954	14.689	14.629	0.010	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
137	1101	00:47:19.59	85:13:19.	16.785	15.527	14.960	14.800	14.742	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
138	1039	00:48:17.78	85:16:41.	17.000	15.494	14.964	14.796	14.785	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	94
139	-1	00:46:33.69	85:10:04.	17.033	15.513	14.970	14.748	14.689	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
140	4681	00:47:16.43	85:13:35.	17.187	15.581	14.988	14.830	14.691	0.007	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	71
141	-1	00:44:44.60	85:18:33.	16.796	15.450	14.990	14.837	14.755	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
142	2108	00:49:05.45	85:16:14.	16.802	15.451	14.991	14.851	14.774	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
143	-1	00:49:46.33	85:10:32.	16.858	15.484	14.996	14.818	14.786	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	96
144	-1	00:51:09.71	85:16:32.	16.931	15.504	14.999	14.830	14.805	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
145	1108	00:46:36.55	85:13:03.	16.980	15.502	15.004	14.845	14.802	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	98
146	1103	00:47:03.62	85:13:36.	16.844	15.581	15.019	14.860	14.758	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	0	0	0	0	97
147	1100	00:47:24.08	85:12:16.	17.002	15.555	15.050	14.892	14.836	0.006	0.004	0.003	0.005	0.0										

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments
				u'	g'	r'	i'	u'	g'	r'	i'	z'	u'	g'	r'	i'	z'	20	21	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
148	1111	00:46:48.95	85:12:44.	16.909	15.530	15.033	14.919	14.976	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	98	
149	1060	00:45:53.62	85:14:31.	16.863	15.523	15.074	14.927	14.823	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	97	
150	1037	00:46:16.87	85:14:20.	17.038	15.588	15.084	14.920	14.867	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	98	
151	1335	00:46:12.39	85:14:01.	17.194	15.650	15.089	14.943	14.912	0.007	0.004	0.003	0.005	0.015	0	0	0	0	0	0	
152	-1	00:45:17.37	85:12:21.	16.921	15.550	15.089	14.910	14.877	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	98	
153	-1	00:51:59.48	85:15:51.	16.923	15.555	15.091	14.924	14.944	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	94	
154	2137	00:50:31.30	85:13:33.	16.860	15.545	15.097	14.958	14.909	0.005	0.004	0.003	0.005	0.015	0	0	0	0	0	98	
155	-1	00:46:14.73	85:19:40.	15.832	15.101	14.797	14.370	14.370	...	0.004	0.003	0.005	0.014	1	0	0	0	0	96	
156	-1	00:45:31.12	85:17:17.	16.924	15.571	15.108	14.941	14.925	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	98	
157	-1	00:44:19.64	85:12:14.	16.582	15.457	15.110	14.985	14.877	0.004	0.004	0.003	0.005	0.015	0	0	0	0	0	0	
158	1041	00:46:44.64	85:16:56.	17.030	15.623	15.117	14.952	14.903	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	98	
159	-1	00:45:01.80	85:09:01.	16.970	15.592	15.126	14.957	14.831	0.006	0.004	0.003	0.005	0.015	0	0	0	0	0	97	
160	1040	00:46:13.15	85:16:05.	17.030	15.610	15.131	14.970	14.923	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	97	
161	-1	00:44:32.22	85:11:36.	16.982	15.608	15.132	14.970	14.867	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
162	-1	00:45:45.99	85:10:01.	16.645	15.571	15.150	14.983	14.933	0.005	0.004	0.004	0.005	0.015	0	0	0	0	0	96	
163	-1	00:43:55.79	85:10:06.	17.065	15.644	15.156	15.004	14.893	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	96	
164	-1	00:52:07.10	85:11:55.	16.968	15.624	15.159	14.980	14.958	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
165	-1	00:49:57.46	85:10:23.	16.988	15.620	15.160	14.950	14.939	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
166	1038	00:46:28.86	85:16:13.	17.126	15.672	15.161	15.007	14.883	0.007	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
167	1014	00:47:43.97	85:15:31.	17.063	15.646	15.165	15.017	15.020	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	96	
168	-1	00:46:55.26	85:10:14.	17.059	15.678	15.166	14.986	14.938	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
169	-1	00:44:23.08	85:17:20.	16.965	15.627	15.168	15.001	14.818	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	96	
170	-1	00:44:57.97	85:16:40.	17.094	15.700	15.227	15.072	15.106	0.006	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
171	-1	00:51:11.99	85:11:09.	17.096	15.709	15.229	15.047	15.033	0.006	0.004	0.004	0.005	0.015	0	0	0	0	0	97	
172	1025	00:47:34.48	85:15:50.	17.187	15.785	15.275	15.091	14.931	0.006	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
173	-1	00:51:40.31	85:09:56.	17.683	16.007	15.243	14.692	14.352	0.010	0.004	0.004	0.005	0.014	0	0	0	0	0	98	
174	2127	00:50:10.95	85:14:58.	16.835	15.625	15.253	15.138	15.114	0.005	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
175	2132	00:50:37.27	85:13:57.	16.962	15.678	15.257	15.121	15.171	0.006	0.004	0.004	0.005	0.016	0	0	0	0	0	96	
176	-1	00:48:42.72	85:11:56.	17.187	15.785	15.275	15.091	14.931	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
177	-1	00:45:12.48	85:14:13.	17.084	15.737	15.284	15.133	15.085	0.006	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
178	1009	00:48:23.50	85:15:15.	17.541	15.880	15.285	15.090	15.048	0.009	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
179	-1	00:53:07.22	85:14:17.	17.160	15.735	15.286	15.087	15.049	0.007	0.004	0.004	0.005	0.015	0	0	0	0	0	97	
180	-1	00:45:32.10	85:14:15.	17.428	15.898	15.287	15.179	15.173	0.008	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
181	-1	00:44:26.82	85:09:20.	17.113	15.759	15.293	15.076	14.837	0.007	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
182	-1	00:46:14.21	85:10:55.	17.277	15.816	15.300	15.118	15.061	0.007	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
183	1104	00:47:00.62	85:13:50.	17.134	15.778	15.304	15.136	15.077	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
184	-1	00:52:02.52	85:14:05.	17.254	15.810	15.319	15.143	15.147	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
185	1092	00:47:51.53	85:13:42.	17.195	15.813	15.335	15.137	15.102	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
186	-1	00:44:01.84	85:14:22.	17.234	15.881	15.356	15.206	15.167	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
187	2097	00:48:44.64	85:15:22.	17.176	15.820	15.357	15.211	15.170	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
188	1080	00:47:11.03	85:14:38.	17.219	15.832	15.363	15.230	15.203	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	95	
189	-1	00:52:49.46	85:13:27.	17.225	15.845	15.364	15.184	14.987	0.007	0.004	0.004	0.005	0.020	0	0	0	0	0	98	
190	-1	00:48:57.34	85:10:04.	17.183	15.829	15.367	15.207	15.236	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	98	
191	-1	00:46:08.59	85:13:16.	19.342	16.664	15.384	14.751	14.412	0.042	0.006	0.004	0.005	0.014	0	0	0	0	0	97	
192	-1	00:47:28.12	85:19:40.	17.225	15.859	15.387	15.193	14.955	0.007	0.004	0.004	0.005	0.015	0	0	0	0	0	98	
193	1013	00:47:44.60	85:15:37.	17.280	15.878	15.388	15.205	15.136	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	97	
194	2106	00:49:40.53	85:16:18.	17.182	15.847	15.391	15.261	15.197	0.007	0.004	0.004	0.006	0.016	0	0	0	0	0	98	
195	-1	00:51:33.37	85:09:26.	17.257	15.883	15.420	15.241	15.099	0.007	0.004	0.004	0.005	0.016	0	0	0	0	0	97	
196	-1	00:44:55.35	85:12:20.	17.259	15.903	15.430	15.258	15.259	0.007	0.004	0.004	0.006	0.016	0	0	0	0	0	97	

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Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments
				u'	g'	r'	i'	u'	g'	r'	i'	u'	g'	r'	i'	z'	z'	20	21	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
197	-1	00:50:41.31	85:19:26.	17.282	15.919	15.460	15.305	15.318	0.007	0.004	0.004	0.006	0.016	0	0	0	0	0	0	90
198	2145	00:49:53.46	85:13:03.	17.314	15.938	15.465	15.311	15.254	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
199	-1	00:47:26.09	85:09:42.	17.303	15.937	15.473	15.322	15.252	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
200	-1	00:48:47.22	85:10:48.	17.553	16.003	15.482	15.300	15.286	0.009	0.004	0.004	0.006	0.016	0	0	0	0	0	0	0
201	-1	00:52:03.34	85:11:47.	17.332	15.956	15.484	15.325	15.298	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	97
202	2157	00:49:44.79	85:12:03.	17.323	15.959	15.484	15.319	15.344	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
203	-1	00:48:44.79	85:10:14.	18.309	16.281	15.508	15.313	15.013	0.017	0.005	0.004	0.004	0.016	0	0	0	0	1	0	0
204	-1	00:49:44.15	85:09:46.	17.643	16.082	15.508	15.319	15.222	0.010	0.004	0.004	0.006	0.016	0	0	0	0	0	0	0
205	-1	00:44:01.76	85:09:06.	17.542	16.048	15.509	15.286	15.128	0.009	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
206	-1	00:45:21.85	85:12:26.	17.332	16.036	15.512	15.331	15.152	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
207	6826	00:50:26.70	85:15:08.	17.650	16.132	15.514	15.177	15.153	0.010	0.005	0.004	0.005	0.016	0	0	0	0	0	0	80
208	-1	00:44:40.80	85:13:08.	17.031	15.907	15.531	15.399	15.307	0.006	0.004	0.004	0.006	0.016	0	0	0	0	0	0	95
209	-1	00:47:16.66	85:10:27.	17.440	16.026	15.534	15.345	15.264	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	95
210	1074	00:46:23.11	85:14:14.	17.471	16.062	15.534	15.414	15.114	0.009	0.004	0.004	0.006	0.016	0	0	0	0	0	0	93
211	1049	00:46:19.50	85:15:23.	17.403	16.009	15.539	15.353	15.391	0.008	0.004	0.004	0.006	0.017	0	0	0	0	0	0	97
212	-1	00:41:12.90	85:16:27.	17.485	16.053	15.541	15.348	15.307	0.009	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
213	2083	00:46:52.82	85:17:43.	17.400	16.025	15.542	15.393	15.307	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	97
214	-1	00:44:16.78	85:17:19.	17.352	16.026	15.546	15.416	15.199	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
215	-1	00:46:35.10	85:19:32.	17.395	16.023	15.554	15.403	15.318	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
216	2184	00:48:16.77	85:11:39.	17.500	16.076	15.563	15.334	15.221	0.009	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
217	-1	00:44:52.12	85:15:54.	17.573	16.128	15.569	15.355	15.267	0.009	0.005	0.004	0.006	0.016	0	0	0	0	0	0	98
218	-1	00:49:03.06	85:10:16.	17.417	16.051	15.575	15.384	15.353	0.008	0.004	0.004	0.006	0.017	0	0	0	0	0	0	95
219	4732	00:48:37.45	85:14:29.	18.022	16.222	15.580	15.355	15.293	0.013	0.005	0.004	0.006	0.016	0	0	0	0	0	0	98
220	-1	00:50:50.12	85:16:11.	17.840	16.234	15.586	15.188	14.982	0.012	0.005	0.004	0.006	0.015	0	0	0	0	0	0	96
221	10600	00:48:11.47	85:13:51.	17.708	16.141	15.586	15.400	15.418	0.010	0.005	0.005	0.006	0.017	0	0	0	0	0	0	95
222	-1	00:43:58.18	85:14:54.	17.583	16.134	15.597	15.404	15.346	0.009	0.005	0.004	0.006	0.016	0	0	0	0	0	0	97
223	-1	00:46:01.55	85:19:36.	17.514	16.096	15.607	15.363	14.970	0.009	0.005	0.004	0.006	0.015	0	0	0	0	0	0	98
224	-1	00:50:25.15	85:11:02.	17.352	16.048	15.608	15.460	15.250	0.008	0.004	0.004	0.006	0.016	0	0	0	0	0	0	98
225	-1	00:51:13.60	85:12:05.	17.540	16.133	15.612	15.399	15.243	0.009	0.005	0.004	0.006	0.016	0	0	0	0	0	0	97
226	-1	00:48:40.94	85:10:14.	16.463	16.629	15.323	15.174	15.099	0.009	0.007	0.008	0.022	1	0	0	0	0	0	0	
227	1136	00:46:51.76	85:14:28.	16.386	15.639	15.397	15.181	15.035	0.005	0.004	0.004	0.006	0.016	1	0	0	0	0	0	79
228	-1	00:48:31.29	85:11:35.	17.557	16.121	15.650	15.315	15.078	0.015	0.005	0.004	0.006	0.016	0	0	0	0	0	0	0
229	-1	00:43:56.95	85:11:18.	17.665	16.177	15.655	15.456	15.431	0.010	0.005	0.004	0.006	0.017	0	0	0	0	0	0	98
230	1021	00:46:50.24	85:15:41.	17.529	16.124	15.663	15.500	15.610	0.009	0.005	0.004	0.006	0.018	0	0	0	0	0	0	98
231	1034	00:47:00.66	85:16:41.	17.607	16.154	15.666	15.480	15.468	0.010	0.005	0.004	0.006	0.017	0	0	0	0	0	0	90
232	2156	00:49:23.01	85:12:08.	17.557	16.160	15.668	15.521	15.352	0.009	0.005	0.004	0.006	0.016	0	0	0	0	0	0	97
233	-1	00:48:31.29	85:09:40.	17.590	16.145	15.674	15.479	15.307	0.010	0.005	0.004	0.006	0.017	0	0	0	0	0	0	98
234	-1	00:47:43.84	85:11:28.	17.925	16.269	15.679	15.472	15.317	0.012	0.005	0.004	0.006	0.016	0	0	0	0	0	0	98
235	2125	00:49:58.56	85:14:45.	17.586	16.169	15.684	15.509	15.353	0.013	0.005	0.004	0.006	0.017	0	0	0	0	0	0	98
236	-1	00:48:40.75	85:10:14.	16.536	15.687	15.308	15.148	15.005	0.004	0.006	0.016	0	1	0	0	0	0	0	98	
237	-1	00:51:28.06	85:12:44.	17.690	16.211	15.690	15.397	15.299	0.010	0.005	0.004	0.006	0.016	0	0	0	0	0	0	98
238	-1	00:43:56.46	85:13:33.	16.386	15.639	15.397	15.181	15.035	0.004	0.004	0.004	0.006	0.016	1	0	0	0	1	0	88
239	1079	00:46:54.41	85:14:58.	17.564	16.166	15.693	15.556	15.540	0.009	0.005	0.004	0.006	0.017	0	0	0	0	0	0	96
240	1028	00:47:51.84	85:16:25.	17.700	16.235	15.698	15.505	15.509	0.010	0.005	0.004	0.006	0.017	0	0	0	0	0	0	98
241	2124	00:49:45.60	85:14:56.	17.988	16.298	15.707	15.528	15.538	0.013	0.005	0.004	0.006	0.017	0	0	0	0	0	0	94
242	-1	00:43:58.03	85:11:29.	17.658	16.220	15.720	15.552	15.388	0.010	0.005	0.004	0.006	0.017	0	0	0	0	0	0	98
243	2115	00:49:26.33	85:16:33.	17.690	16.226	15.722	15.569	15.413	0.010	0.005	0.004	0.006	0.017	0	0	0	0	0	0	98
244	1011	00:48:22.50	85:15:54.	18.345	16.481	15.724	15.405	15.252	0.018	0.005	0.004	0.006	0.016	0	0	0	0	0	0	96
245	-1	00:50:49.98	85:16:11.	18.325	16.432	15.728	15.418	15.145	0.033	0.009	0.007	0.009	0.021	0	0	0	0	0	0	96

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
246	-1	00:45:32.76	85:14:07.	16.237	15.732	15.755	...	17.671	16.279	15.747	15.482	15.438	0.010	0.005	0.004	0.007	...	1	0	0	0	1	92
247	2139	00:50:45.27	85:13:18.	17.771	16.305	15.754	15.577	15.597	18.054	16.370	15.761	15.546	15.399	0.014	0.005	0.004	0.018	0	0	0	0	0	97
248	1081	00:47:06.27	85:14:31.	17.735	16.315	15.754	15.577	15.597	17.939	16.360	15.794	15.596	15.695	0.013	0.005	0.005	0.017	0	0	0	0	0	98
249	1016	00:47:30.45	85:15:15.	18.054	16.370	15.761	15.546	15.399	18.177	16.636	15.736	15.579	15.743	0.015	0.006	0.006	0.018	0	0	0	0	0	99
250	1113	00:46:43.60	85:12:06.	17.813	16.351	15.795	15.612	15.539	18.015	16.365	15.824	15.622	15.565	0.011	0.005	0.005	0.017	0	0	0	0	0	98
251	-1	00:52:46.18	85:12:14.	17.840	16.298	15.799	15.602	15.560	17.814	16.319	15.824	15.622	15.565	0.011	0.005	0.005	0.018	0	0	0	0	0	97
252	2155	00:49:19.36	85:12:00.	17.817	16.317	15.799	15.596	15.551	17.817	16.317	15.799	15.596	15.551	0.011	0.005	0.005	0.017	0	0	0	0	0	95
253	-1	00:52:53.74	85:17:00.	17.320	16.193	15.811	15.640	15.512	17.320	16.315	15.813	15.652	15.534	0.008	0.005	0.005	0.017	0	0	0	0	0	87
254	-1	00:46:25.75	85:11:08.	17.735	16.315	15.813	15.652	15.534	17.814	16.332	15.852	15.671	15.587	0.011	0.005	0.005	0.017	0	0	0	0	0	91
255	2098	00:48:22.07	85:17:32.	17.814	16.314	15.814	15.700	15.580	17.814	16.341	15.855	15.640	15.689	0.013	0.005	0.005	0.017	...	1	1	1	1	88
256	1158	00:47:36.89	85:13:42.	18.015	16.365	15.824	15.622	15.565	18.015	16.365	15.824	15.622	15.565	0.013	0.005	0.005	0.018	0	0	0	0	0	90
257	2104	00:49:23.50	85:17:15.	17.901	16.400	15.834	15.616	15.532	17.901	16.400	15.834	15.616	15.532	0.012	0.005	0.005	0.017	0	0	0	0	0	95
258	-1	00:46:57.21	85:11:17.	18.062	16.469	15.843	15.457	15.127	17.811	16.352	15.852	15.671	15.587	0.011	0.005	0.005	0.016	0	0	0	0	0	5
259	-1	00:51:11.87	85:12:33.	17.962	16.438	15.843	15.457	15.127	17.814	16.352	15.852	15.671	15.589	0.011	0.005	0.005	0.016	0	0	0	0	0	90
260	-1	00:49:10.08	85:09:09.	17.748	16.346	15.855	15.640	15.569	17.814	16.346	15.855	15.640	15.569	0.011	0.005	0.005	0.018	0	0	0	0	0	90
261	-1	00:51:40.59	85:15:05.	17.818	16.384	15.888	15.733	15.746	17.818	16.384	15.888	15.733	15.746	0.011	0.005	0.005	0.014	1	0	0	0	0	90
262	-1	00:51:07.19	85:17:13.	17.907	16.447	15.934	15.767	15.713	17.907	16.447	15.934	15.767	15.713	0.012	0.005	0.005	0.019	0	0	0	0	0	90
263	-1	00:52:07.91	85:17:58.	17.888	16.426	15.922	15.756	15.881	17.888	16.426	15.922	15.756	15.881	0.010	0.005	0.005	0.018	0	0	0	0	0	97
264	2146	00:49:53.81	85:12:50.	17.657	16.368	15.891	15.709	15.697	17.925	16.438	15.930	15.786	15.727	0.012	0.005	0.005	0.019	0	0	0	0	0	49
265	-1	00:47:02.55	85:13:44.	17.823	16.354	15.907	15.716	15.829	17.923	16.354	15.907	15.716	15.829	0.011	0.005	0.005	0.019	0	0	0	0	0	96
266	2154	00:49:22.52	85:12:05.	17.962	16.427	15.911	15.722	15.589	17.962	16.426	15.912	15.722	15.589	0.013	0.005	0.005	0.018	0	0	0	0	0	98
267	-1	00:45:11.58	85:16:56.	18.057	16.484	15.920	15.706	15.595	18.057	16.484	15.920	15.706	15.595	0.014	0.005	0.005	0.018	0	0	0	0	0	98
268	2055	00:47:24.58	85:17:45.	17.907	16.447	15.934	15.767	15.713	17.907	16.447	15.934	15.767	15.713	0.012	0.005	0.005	0.019	0	0	0	0	0	98
269	1039	00:46:28.43	85:15:58.	17.888	16.426	15.922	15.756	15.881	17.888	16.426	15.922	15.756	15.881	0.012	0.005	0.005	0.020	0	0	0	0	0	97
270	1095	00:48:22.52	85:13:02.	17.925	16.438	15.930	15.786	15.727	17.925	16.438	15.930	15.786	15.727	0.012	0.005	0.005	0.019	0	0	0	0	0	96
271	2140	00:50:56.31	85:12:58.	17.861	16.446	15.931	15.777	15.749	17.861	16.446	15.931	15.777	15.749	0.012	0.005	0.005	0.019	0	0	0	0	0	98
272	2110	00:48:45.53	85:16:11.	17.915	16.426	15.932	15.764	15.824	17.915	16.426	15.932	15.764	15.824	0.012	0.005	0.005	0.019	0	0	0	0	0	98
273	2180	00:46:57.07	85:11:49.	17.907	16.447	15.934	15.767	15.713	17.907	16.447	15.934	15.767	15.713	0.012	0.005	0.005	0.019	0	0	0	0	0	98
274	1035	00:46:16.17	85:16:37.	18.416	16.635	15.957	15.693	15.538	18.068	16.476	15.958	15.817	15.654	0.013	0.005	0.005	0.018	0	0	0	0	0	98
275	2112	00:50:18.36	85:16:08.	17.966	16.476	15.958	15.817	15.654	18.108	16.544	15.964	15.673	15.412	0.014	0.005	0.005	0.019	0	0	0	0	0	96
276	2149	00:49:24.35	85:12:52.	17.997	16.479	15.971	15.833	15.744	17.997	16.511	15.999	15.860	15.736	0.013	0.005	0.005	0.019	0	0	0	0	0	98
277	-1	00:51:38.38	85:15:25.	17.983	16.528	15.976	15.768	15.709	18.199	16.545	16.043	15.878	15.637	0.013	0.005	0.005	0.020	1	0	0	0	0	98
278	-1	00:47:46.36	85:14:58.	18.177	16.636	16.075	15.859	15.743	18.174	16.579	16.012	15.858	15.809	0.015	0.006	0.006	0.018	0	0	0	0	0	98
279	-1	00:49:25.34	85:14:53.	17.931	16.499	15.981	15.792	15.742	17.931	16.499	15.981	15.792	15.742	0.013	0.005	0.005	0.019	0	0	0	0	0	96
280	-1	00:52:39.71	85:14:21.	17.954	16.536	16.012	15.842	15.732	18.300	16.619	16.033	15.742	15.727	0.017	0.006	0.005	0.019	0	0	0	0	0	97
281	2007	00:45:16.40	85:17:00.	18.036	16.529	15.998	15.809	15.732	18.019	16.545	16.043	15.878	15.637	0.013	0.005	0.005	0.019	0	0	0	0	0	98
282	-1	00:51:06.03	85:17:19.	17.337	16.035	15.068	14.637	15.744	18.019	16.545	16.043	15.878	15.637	0.013	0.005	0.005	0.019	0	0	0	0	0	98
283	-1	00:47:22.10	85:12:53.	18.177	16.636	16.075	15.859	15.743	18.177	16.636	16.075	15.859	15.743	0.015	0.006	0.006	0.019	0	0	0	0	0	98
284	2121	00:49:20.34	85:14:53.	18.174	16.629	16.072	15.859	15.743	18.429	16.727	16.032	15.860	15.743	0.019	0.006	0.006	0.019	0	0	0	0	0	98
285	-1	00:45:16.40	85:12:55.	18.098	16.609	16.033	15.912	15.768	18.098	16.609	16.033	15.912	15.768	0.014	0.006	0.005	0.019	0	0	0	0	0	98
286	-1	00:51:06.03	85:17:19.	17.337	16.035	15.068	14.637	15.744	18.019	16.545	16.043	15.878	15.637	0.013	0.005	0.005	0.019	1	0	0	0	0	97
287	-1	00:47:46.36	85:19:35.	18.019	16.545	16.043	15.878	15.637	18.019	16.545	16.043	15.878	15.637	0.013	0.005	0.005	0.021	0	0	0	0	0	87
288	-1	00:46:22.10	85:12:53.	18.177	16.636	16.075	15.859	15.743	18.177	16.636	16.075	15.859	15.743	0.015	0.006	0.006	0.018	0	0	0	0	0	98
289	1109	00:46:10.80	85:12:08.	18.174	16.629	16.072	15.859	15.743	18.174	16.629	16.072	15.859	15.743	0.019	0.006	0.006	0.019	0	0	0	0	0	98
290	2148	00:49:20.34	85:14:53.	18.174	16.629	16.072	15.859	15															

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	u'	g'	r'	i'	z'	u'	g'	r'	i'	z'	Flag	r'	i'	z'	Membership Probability	Comments	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	
295	1031	00:47:26.18	85:16:55.	18.165	16.646	16.119	15.956	15.878	0.015	0.006	0.005	0.008	0.020	0	0	0	0	0	98	
296	4279	00:49:14.53	85:15:14.	... .	16.895	16.134	15.858	15.906	...	0.006	0.005	0.007	0.020	1	0	0	0	0	96
297	1070	00:48:43.57	85:15:36.	18.434	16.758	16.138	15.932	15.788	0.019	0.006	0.005	0.007	0.019	0	0	0	0	0	95	
4498	1049	00:49:37.19	85:15:53.	18.551	16.874	16.145	15.785	15.485	0.021	0.006	0.006	0.007	0.017	0	0	0	0	0	94	
298	2144	00:49:08.77	85:13:26.	18.232	16.702	16.157	15.991	15.933	0.016	0.006	0.006	0.008	0.021	0	0	0	0	0	96	
299	-1	00:47:12.23	85:10:39.	18.209	16.703	16.164	15.977	15.882	0.016	0.006	0.006	0.008	0.020	0	0	0	0	0	98	
300	4703	00:47:54.84	85:12:24.	18.232	16.718	16.167	15.922	15.911	0.016	0.006	0.006	0.007	0.020	0	0	0	0	0	97	
301	2109	00:48:58.55	85:15:59.	18.299	16.713	16.173	16.045	15.930	0.017	0.006	0.006	0.008	0.020	0	0	0	0	0	97	
302	-1	00:44:13.99	85:16:33.	... .	16.919	16.713	16.175	15.789	...	0.007	0.006	0.007	0.019	1	0	0	0	0	91
303	4219	00:49:18.49	85:16:52.	17.900	16.681	16.201	16.006	15.910	0.012	0.006	0.006	0.008	0.020	0	0	0	0	0	0	
304	1044	00:46:08.61	85:17:16.	17.805	16.751	16.212	16.037	16.075	0.017	0.006	0.006	0.008	0.022	0	0	0	0	0	98	
305	4703	00:49:39.02	85:15:06.	18.718	16.878	16.214	15.906	15.945	0.024	0.007	0.006	0.007	0.021	0	0	0	0	0	0	
306	-1	00:45:02.87	85:09:46.	18.291	16.781	16.215	16.021	16.148	0.017	0.006	0.006	0.008	0.023	0	0	0	0	0	96	
307	4703	00:46:08.75	85:17:16.	18.230	16.756	16.217	16.069	16.054	0.031	0.011	0.010	0.014	0.037	0	0	0	0	0	98	
308	1044	00:45:35.59	85:17:22.	17.840	16.688	16.222	16.019	16.033	0.012	0.006	0.006	0.008	0.021	0	0	0	0	0	0	
309	-1	00:47:58.57	85:09:27.	18.344	16.752	16.231	16.025	15.833	0.018	0.006	0.006	0.008	0.020	0	0	0	0	0	96	
310	-1	00:50:33.99	85:16:10.	18.540	16.865	16.241	15.985	16.045	0.021	0.006	0.006	0.008	0.022	0	0	0	0	0	96	
311	4703	00:46:13.13	85:16:34.	17.973	16.702	16.243	16.011	15.916	0.013	0.006	0.006	0.008	0.020	0	0	0	0	0	0	
312	4454	00:46:03.13	85:16:34.	18.470	16.808	16.254	16.067	16.232	0.020	0.006	0.006	0.008	0.025	0	0	0	0	0	98	
313	1064	00:48:02.78	85:13:14.	18.470	16.808	16.254	16.067	16.232	0.019	0.006	0.006	0.008	0.023	0	0	0	0	0	98	
314	-1	00:45:18.16	85:15:13.	18.454	16.826	16.261	16.083	16.181	0.028	0.007	0.006	0.008	0.021	0	0	0	0	0	82	
315	1305	00:47:33.32	85:16:24.	18.887	16.963	16.261	16.054	16.011	0.028	0.007	0.006	0.008	0.021	0	0	0	0	0	96	
316	4332	00:46:16.77	85:15:35.	... .	16.264	16.148	... .	... .	0.006	0.008	... .	1	1	0	0	0	0	86	
317	-1	00:44:01.89	85:13:03.	17.997	16.721	16.273	16.087	16.157	0.013	0.006	0.006	0.008	0.023	0	0	0	0	0	96	
318	-1	00:48:02.02	85:19:24.	18.473	16.844	16.276	16.034	16.139	0.020	0.006	0.006	0.008	0.023	0	0	0	0	0	98	
319	2128	00:49:42.69	85:14:36.	18.145	16.768	16.283	16.120	16.008	0.015	0.006	0.006	0.008	0.021	0	0	0	0	0	97	
320	-1	00:51:08.62	85:16:41.	18.739	16.826	16.284	16.026	15.939	0.025	0.007	0.006	0.008	0.021	0	0	0	0	0	99	
321	2365	00:49:27.79	85:12:06.	16.840	16.302	16.140	15.930	0.006	0.006	0.006	0.008	0.020	1	0	0	0	0	93
322	-1	00:44:42.79	85:17:41.	18.847	16.980	16.308	16.036	16.044	0.027	0.007	0.006	0.008	0.022	0	0	0	0	0	97	
323	4888	00:48:55.11	85:10:15.	18.499	16.871	16.315	16.127	16.222	0.020	0.006	0.006	0.008	0.024	0	0	0	0	0	96	
324	1068	00:48:35.30	85:15:17.	18.469	16.864	16.319	16.148	16.267	0.023	0.006	0.006	0.009	0.025	0	0	0	0	0	97	
325	-1	00:52:30.26	85:15:38.	18.665	16.936	16.320	16.016	15.794	0.023	0.007	0.006	0.008	0.019	0	0	0	0	0	98	
326	2069	00:48:18.55	85:17:33.	18.333	16.821	16.320	16.152	16.066	0.017	0.006	0.006	0.008	0.022	0	0	0	0	0	93	
327	-1	00:44:12.77	85:12:35.	18.657	16.923	16.331	16.118	16.017	0.023	0.007	0.006	0.008	0.021	0	0	0	0	0	98	
328	4502	00:45:56.86	85:12:15.	... .	16.899	16.368	16.048	16.036	... .	0.007	0.006	0.008	0.038	1	0	0	0	0	98
329	-1	00:44:33.12	85:18:02.	18.520	16.940	16.370	16.193	15.925	0.020	0.007	0.007	0.009	0.025	0	0	0	0	0	91	
330	1046	00:46:06.47	85:16:32.	18.731	17.053	16.387	16.097	15.932	0.024	0.007	0.006	0.008	0.021	0	0	0	0	0	98	
331	-1	00:51:33.73	85:15:39.	18.644	16.996	16.326	16.046	15.916	0.023	0.007	0.006	0.009	0.025	0	0	0	0	0	98	
332	2147	00:50:21.82	85:12:32.	18.297	16.908	16.396	16.242	16.261	0.017	0.007	0.006	0.009	0.024	0	0	0	0	0	98	
333	1066	00:48:06.62	85:12:56.	18.767	17.042	16.420	16.192	16.148	0.025	0.007	0.007	0.009	0.023	0	0	0	0	0	98	
334	-1	00:48:11.11	85:10:12.	18.592	16.992	16.420	16.208	16.328	0.022	0.007	0.007	0.009	0.025	0	0	0	0	0	98	
335	4532	00:46:13.64	85:18:10.	... .	17.271	16.427	16.135	15.78	... .	0.008	0.007	0.008	0.019	1	0	0	0	0	98
336	-1	00:45:18.50	85:18:36.	18.747	17.111	16.439	16.183	16.309	0.025	0.008	0.007	0.009	0.025	0	0	0	0	0	97	
337	-1	00:51:04.79	85:16:27.	... .	17.044	16.439	16.166	... .	0.007	0.007	0.009	0.019	1	0	0	0	0	97	
338	-1	00:51:22.22	85:11:11.	17.157	16.423	16.155	... .	0.008	0.007	0.008	0.018	1	0	0	0	0	97		
339	4639	00:48:25.91	85:12:23.	... .	17.637	16.466	15.950	15.830	... .	0.011	0.007	0.008	0.019	0	0	0	0	0	93
340	2087	00:46:53.91	85:18:17.	19.303	17.231	16.467	16.256	16.024	0.041	0.008	0.007	0.009	0.021	0	0	0	0	0	93	
341	-1	00:51:34.59	85:12:44.	18.967	17.188	16.472	16.187	16.107	0.030	0.008	0.007	0.009	0.022	0	0	0	0	0	98	
342	-1	00:47:03.72	85:10:49.	18.684	17.033	16.482	16.283	16.421	0.024	0.007	0.007	0.009	0.022	0	0	0	0	0	97	
343	2101	00:48:54.90	85:17:12.	18.770	17.104	16.486	16.333	16.153	0.025	0.008	0.007	0.010	0.023	0	0	0	0	0	91	

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments	
				u'	g'	r'	i'	u'	g'	r'	i'	u'	g'	r'	i'	z'	20	21	20	21	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
344	-1	00:47:52.06	85:19:08.	15.962	16.122	16.491	16.830	...	0.003	0.005	0.007	0.014	...	0	0	0	1	90	0	b	
345	2130	00:49:44.87	85:13:58.	18.712	17.071	16.506	16.364	16.220	0.024	0.007	0.007	0.010	0.024	0	0	0	0	0	0	88	
346	1110	00:46:18.99	85:12:47.	19.008	17.143	16.251	16.424	...	0.031	0.008	0.007	0.009	0.027	0	0	0	0	0	0	0	
347	1161	00:48:25.41	85:14:35.	17.490	16.512	16.101	15.917	...	0.010	0.007	0.008	0.020	0	0	0	0	0	0	73		
348	2182	00:47:53.20	85:11:49.	18.717	17.103	16.520	16.336	16.020	0.024	0.008	0.007	0.010	0.021	0	0	0	0	0	0	96	
349	1022	00:46:55.72	85:15:48.	18.783	17.111	16.521	16.321	16.442	0.026	0.008	0.007	0.010	0.028	0	0	0	0	0	0	97	
350	-1	00:49:43.37	85:19:20.	18.431	17.057	16.524	16.272	16.386	0.019	0.007	0.007	0.010	0.027	0	0	0	0	0	0	0	
351	-1	00:42:18.46	85:18:30.	18.784	17.136	16.528	16.308	16.195	0.026	0.008	0.007	0.009	0.023	0	0	0	0	0	0	96	
352	1023	00:47:06.47	85:15:46.	18.913	17.115	16.532	16.316	16.315	0.029	0.008	0.007	0.010	0.025	0	0	0	0	0	0	91	
353	2142	00:50:55.45	85:12:42.	18.866	17.155	16.535	16.341	16.374	0.028	0.008	0.007	0.010	0.026	0	0	0	0	0	0	98	
354	-1	00:46:30.95	85:11:07.	17.155	16.538	16.163	16.119	...	0.008	0.007	0.009	0.011	0	0	0	0	0	0	93		
355	2135	00:51:04.67	85:13:17.	18.790	17.141	16.541	16.271	16.175	0.026	0.008	0.007	0.009	0.023	0	0	0	0	0	0	96	
356	-1	00:45:29.35	85:15:11.	17.691	16.547	15.952	15.664	...	0.011	0.007	0.008	0.018	1	0	0	0	0	0	0		
357	2335	00:48:19.21	85:11:46.	17.320	16.553	16.276	16.234	...	0.009	0.007	0.009	0.024	1	0	0	0	0	0	90		
358	1083	00:47:32.75	85:14:41.	19.006	17.223	16.569	16.378	16.257	0.031	0.008	0.007	0.010	0.025	0	0	0	0	0	0	97	
359	2141	00:50:50.46	85:13:04.	18.851	17.175	16.573	16.352	16.314	0.027	0.008	0.007	0.010	0.025	0	0	0	0	0	0	97	
360	-1	00:45:30.58	85:09:40.	17.310	16.574	16.268	16.416	...	0.009	0.007	0.009	0.027	1	0	0	0	0	0	0		
361	1007	00:48:37.19	85:14:55.	18.664	17.137	16.360	16.414	...	0.023	0.008	0.007	0.010	0.027	0	0	0	0	0	0	95	
362	2143	00:50:10.57	85:13:34.	17.341	16.585	16.323	16.206	...	0.009	0.007	0.010	0.024	1	0	0	0	0	0	95		
363	-1	00:51:21.52	85:09:22.	18.964	17.198	16.592	16.387	16.143	0.030	0.008	0.007	0.010	0.023	0	0	0	0	0	0	98	
364	1119	00:48:45.24	85:14:11.	17.449	16.598	16.239	16.049	...	0.010	0.008	0.009	0.022	1	0	0	0	0	0	93		
365	2094	00:48:44.16	85:18:37.	18.789	17.249	16.606	16.403	16.159	0.026	0.008	0.008	0.010	0.023	0	0	0	0	0	0	97	
366	-1	00:48:09.95	85:19:18.	18.897	17.231	16.608	16.433	16.485	0.028	0.008	0.008	0.010	0.028	0	0	0	0	0	0	0	
367	-1	00:49:08.17	85:11:09.	18.770	17.200	16.611	16.401	16.249	0.025	0.008	0.008	0.010	0.024	0	0	0	0	0	0	95	
368	4445	00:47:19.22	85:14:37.	18.992	17.238	16.640	16.493	16.322	0.031	0.008	0.008	0.011	0.029	0	0	0	0	0	0	98	
369	-1	00:51:16.74	85:18:23.	19.274	17.382	16.649	16.429	16.294	0.040	0.008	0.008	0.010	0.025	0	0	0	0	0	0	94	
370	-1	00:49:22.15	85:19:35.	18.949	17.392	16.659	16.501	16.199	0.030	0.008	0.008	0.011	0.024	0	0	0	0	0	0	97	
371	-1	00:44:51.73	85:17:57.	19.113	17.327	16.673	16.480	16.462	0.034	0.009	0.008	0.011	0.028	0	0	0	0	0	0	0	
372	-1	00:44:11.43	85:14:50.	18.615	17.197	16.684	16.527	16.346	0.022	0.008	0.008	0.011	0.026	0	0	0	0	0	0	96	
373	2339	00:48:50.14	85:12:15.	17.168	16.696	16.348	...	...	0.008	0.008	0.010	0.010	1	0	0	0	0	0	93	
374	4539	00:49:10.43	85:16:57.	19.214	17.385	16.719	16.428	16.428	0.038	0.009	0.008	0.010	0.027	0	0	0	0	0	0	98	
375	-1	00:46:26.52	85:09:36.	17.455	16.745	16.413	16.410	...	0.010	0.008	0.008	0.027	1	0	0	0	0	0	98		
376	-1	00:51:27.14	85:19:44.	18.720	17.332	16.782	16.512	16.400	0.024	0.008	0.008	0.011	0.027	0	0	0	0	0	0	95	
377	1058	00:45:55.10	85:15:03.	18.416	17.209	16.743	16.591	16.434	0.019	0.008	0.008	0.012	0.027	0	0	0	0	0	0	98	
378	-1	00:49:41.02	85:09:43.	18.284	17.408	16.744	16.605	16.484	0.017	0.009	0.008	0.012	0.028	0	0	0	0	0	0	96	
379	1118	00:46:16.57	85:14:55.	17.584	16.745	16.475	16.718	...	0.011	0.008	0.011	0.034	1	0	0	0	0	0	93		
380	4553	00:46:16.79	85:17:29.	19.368	17.422	16.745	16.562	16.583	0.043	0.009	0.009	0.011	0.030	0	0	0	0	0	0	97	
381	-1	00:49:34.31	85:11:28.	18.280	17.322	16.782	16.461	16.030	0.017	0.009	0.009	0.010	0.021	0	0	0	0	0	0	95	
382	1168	00:46:23.53	85:12:45.	17.467	16.787	16.488	16.286	...	0.010	0.009	0.009	0.011	0.058	1	0	0	0	0	0	98	
383	-1	00:46:49.17	85:11:33.	19.258	17.418	16.789	16.541	16.449	0.039	0.009	0.009	0.012	0.028	0	0	0	0	0	0	93	
384	-1	00:51:07.40	85:12:24.	18.435	17.219	16.792	16.622	16.691	0.019	0.008	0.009	0.012	0.033	0	0	0	0	0	0	98	
385	-1	00:44:37.20	85:09:49.	19.253	17.438	16.794	16.528	16.520	0.039	0.009	0.009	0.011	0.029	0	0	0	0	0	0	98	
386	4233	00:48:47.15	85:14:04.	17.904	16.804	16.202	16.192	...	0.013	0.009	0.009	0.020	1	0	0	0	0	0	0		
387	-1	00:45:41.85	85:15:35.	19.459	17.519	16.807	16.655	16.956	0.047	0.010	0.009	0.012	0.041	0	0	0	0	0	0	96	
388	4630	00:46:41.96	85:18:13.	19.040	17.463	16.812	16.585	16.573	0.032	0.010	0.009	0.012	0.030	0	0	0	0	0	0	98	
389	-1	00:50:47.91	85:10:32.	17.751	16.821	16.474	16.567	...	0.012	0.009	0.011	0.030	1	0	0	0	0	0	0		
390	-1	00:46:25.58	85:11:33.	17.536	16.830	16.544	16.519	...	0.010	0.009	0.011	0.029	1	0	0	0	0	0	98		
391	-1	00:50:38.84	85:10:08.	17.504	16.832	16.497	16.390	...	0.011	0.009	0.011	0.027	1	0	0	0	0	0	0		
392	1124	00:47:04.29	85:15:01.	17.620	16.839	16.528	16.128	...	0.011	0.009	0.011	0.023	1	0	0	0	0	0	93		

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments	
				u'	g'	r'	i'	u'	g'	r'	i'	u'	g'	r'	i'	u'	g'	r'	i'		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
393	-1	00:48:38.59	85:10:07.	...	17.567	16.834	16.539	16.261	...	0.010	0.009	0.011	0.024	1	0	0	0	0	0	0	83
394	2379	00:50:37.49	85:12:14.	19.165	17.526	16.873	16.628	16.789	0.036	0.010	0.009	0.012	0.035	0	0	0	0	0	0	0	97
395	1121	00:47:37.76	85:12:14.	...	17.572	16.877	16.731	16.516	...	0.010	0.009	0.013	0.029	1	0	0	0	0	0	0	95
396	-1	00:47:25.04	85:09:21.	...	17.618	16.879	16.628	16.365	...	0.011	0.009	0.012	0.026	1	0	0	0	0	0	0	0
397	-1	00:47:15.46	85:09:27.	20.000	17.994	16.901	16.451	16.163	0.076	0.014	0.009	0.010	0.023	0	0	0	0	0	0	0	0
398	1135	00:46:49.49	85:13:59.	19.521	17.560	16.913	16.714	16.677	0.049	0.010	0.013	0.033	0	0	0	0	0	0	0	98	
399	4740	00:50:18.85	85:14:10.	...	18.442	16.916	15.413	14.757	...	0.021	0.010	0.016	0.045	1	0	0	0	0	0	0	a
400	-1	00:51:10.90	85:15:19.	...	17.634	16.931	16.805	16.665	...	0.011	0.010	0.014	0.032	1	0	0	0	0	0	0	96
401	1145	00:47:07.88	85:17:00.	20.472	17.729	16.939	16.753	16.776	0.118	0.012	0.010	0.035	0	0	0	0	0	0	0	97	
402	-1	00:48:48.21	85:09:09.	...	17.580	16.942	16.717	16.735	...	0.010	0.010	0.013	0.034	1	0	0	0	0	0	0	62
403	-1	00:52:36.12	85:16:40.	19.161	17.677	16.966	16.632	16.632	0.036	0.011	0.010	0.012	...	0	0	0	0	0	0	0	b
404	-1	00:45:35.99	85:11:59.	...	17.592	16.972	16.690	16.918	...	0.011	0.010	0.013	0.039	1	0	0	0	0	0	0	98
405	4245	00:49:25.87	85:13:45.	...	17.694	16.975	16.712	16.479	...	0.011	0.010	0.013	0.028	1	0	0	0	0	0	0	b
406	4315	00:49:31.99	85:14:21.	...	17.728	16.985	16.757	16.834	...	0.012	0.010	0.013	0.036	1	0	0	0	0	0	0	97
407	1120	00:46:55.98	85:16:04.	19.839	17.567	16.987	16.853	16.934	0.066	0.011	0.010	0.040	0	0	0	0	0	0	0	97	
408	4431	00:47:44.09	85:14:08.	18.583	17.397	16.987	16.851	17.470	0.022	0.009	0.010	0.014	0.062	0	0	0	0	0	0	0	26
409	-1	00:52:36.31	85:16:41.	...	17.627	16.990	16.634	16.634	...	0.021	0.019	0.023	...	1	0	0	0	0	0	0	b
410	-1	00:51:33.70	85:11:14.	18.944	17.538	17.004	16.781	16.602	0.030	0.010	0.010	0.031	0	0	0	0	0	0	0	98	
411	4322	00:49:01.21	85:12:51.	...	17.598	17.008	16.706	16.448	...	0.011	0.010	0.013	0.028	1	0	0	0	0	0	0	94
412	-1	00:46:07.21	85:18:43.	18.323	17.384	17.014	16.990	17.452	0.017	0.009	0.010	0.062	0	0	0	0	0	0	0	b	
413	-1	00:49:31.00	85:10:12.	...	17.726	16.055	16.804	16.866	...	0.012	0.011	0.014	0.038	1	0	0	0	0	0	0	94
414	2381	00:50:14.10	85:13:18.	...	17.801	17.085	16.750	17.089	...	0.012	0.011	0.013	0.045	1	0	0	0	0	0	0	95
415	1117	00:45:54.51	85:14:45.	...	17.885	17.086	16.809	16.822	...	0.013	0.011	0.014	0.036	1	0	0	0	0	0	0	98
416	-1	00:45:05.83	85:18:06.	...	18.020	17.097	16.802	16.777	...	0.015	0.011	0.014	0.035	1	0	0	0	0	0	0	b
417	-1	00:49:19.95	85:13:19.	...	17.850	17.097	16.724	16.724	...	0.013	0.011	0.024	...	1	0	0	0	0	0	0	95
418	-1	00:50:44.69	85:11:38.	...	17.960	17.140	16.710	16.709	...	0.014	0.011	0.013	0.033	1	0	0	0	0	0	0	94
419	-1	00:48:14.13	85:19:06.	...	17.850	17.144	16.833	17.033	...	0.013	0.011	0.014	0.043	1	0	0	0	0	0	0	97
420	4422	00:46:00.64	85:11:43.	...	17.846	17.145	16.920	16.629	...	0.013	0.011	0.015	0.031	1	0	0	0	0	0	0	97
421	1138	00:47:37.49	85:15:40.	...	17.847	17.157	17.028	16.733	...	0.014	0.012	0.014	0.036	1	0	0	0	0	0	0	93
422	-1	00:52:03.75	85:13:47.	...	17.819	17.161	16.938	17.413	...	0.013	0.012	0.015	0.118	0	0	0	0	0	0	0	b
423	-1	00:51:58.23	85:09:27.	...	17.937	17.175	16.918	16.565	...	0.014	0.012	0.015	0.056	1	0	0	0	0	0	0	97
424	-1	00:49:32.23	85:12:59.	19.924	18.098	17.182	16.859	16.700	0.071	0.016	0.012	0.037	0	0	0	0	0	0	0	96	
425	-1	00:47:12.14	85:09:36.	18.977	17.689	17.186	16.916	16.926	0.030	0.011	0.012	0.076	0	0	0	0	0	0	0	84	
426	1137	00:47:07.56	85:14:49.	...	17.898	17.190	16.869	16.682	...	0.014	0.012	0.015	0.033	1	0	0	0	0	0	0	b
427	-1	00:45:28.19	85:17:04.	...	17.207	16.920	16.956	16.956	...	0.023	0.029	0.079	1	1	0	0	0	0	0	90	
428	-1	00:45:46.19	85:10:27.	...	17.973	17.218	16.985	17.466	...	0.014	0.012	0.015	0.062	1	0	0	0	0	0	0	b
429	-1	00:46:29.91	85:10:43.	...	18.216	17.221	16.860	16.558	...	0.017	0.012	0.014	0.037	1	0	0	0	0	0	0	97
430	4337	00:47:14.50	85:18:13.	...	18.066	17.244	16.876	16.746	...	0.015	0.012	0.014	0.034	1	0	0	0	0	0	0	b
431	-1	00:49:58.29	85:11:19.	...	18.163	17.258	16.804	16.804	...	0.017	0.013	0.014	...	1	0	0	0	0	0	0	93
432	4671	00:50:14.43	85:16:27.	...	18.040	17.261	16.980	17.347	...	0.015	0.013	0.016	0.111	1	0	0	0	0	0	0	b
433	-1	00:48:40.43	85:10:37.	...	17.980	17.270	17.005	17.087	...	0.014	0.013	0.016	0.045	1	0	0	0	0	0	0	97
434	-1	00:47:29.33	85:18:43.	...	18.330	17.311	16.982	16.615	...	0.019	0.013	0.016	0.031	1	0	0	0	0	0	0	b
435	-1	00:44:49.04	85:10:04.	...	18.074	17.314	17.096	17.085	...	0.015	0.013	0.017	0.045	1	0	0	0	0	0	0	98
436	1122	00:48:33.58	85:14:58.	...	18.069	17.315	17.154	17.452	...	0.016	0.013	0.018	0.062	1	0	0	0	0	0	0	95
437	1142	00:46:44.12	85:17:11.	...	18.066	17.318	16.943	16.943	...	0.015	0.013	0.015	...	1	0	0	0	0	0	0	b
438	-1	00:47:39.81	85:19:00.	...	18.146	17.325	17.101	16.674	...	0.016	0.013	0.017	0.062	1	0	0	0	0	0	0	b
439	-1	00:44:24.76	85:13:37.	...	18.335	17.332	17.091	17.215	...	0.019	0.013	0.017	0.099	1	0	0	0	0	0	0	91
440	4198	00:48:52.72	85:15:43.	18.694	18.101	17.336	17.117	17.140	0.024	0.016	0.014	0.047	0	0	0	0	0	0	0	90	
441	-1	00:45:28.05	85:17:04.	...	18.112	17.340	16.811	16.719	...	0.016	0.014	0.014	0.034	1	0	0	0	0	0	0	a

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments
				u'	g'	r'	i'	u'	g'	r'	i'	z'	u'	g'	r'	i'	z'	20	21	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
442	-1	00:51:49.07	85:16:39.	...	18.031	17.343	16.969	...	...	0.015	0.014	0.016	...	1	0	0	0	1	84	b
443	4581	00:50:44.11	85:15:09.	...	18.400	17.343	16.962	16.580	...	0.020	0.014	0.016	0.030	1	0	0	0	0	98	
444	1141	00:47:14.10	85:16:26.	...	18.370	17.354	16.950	16.717	...	0.020	0.014	0.016	0.034	1	0	0	0	0	91	b
445	-1	00:52:32.19	85:16:36.	...	17.364	16.715	16.592	...	...	0.014	0.013	0.033	1	1	0	0	0	0		
446	-1	00:45:05.51	85:19:37.	...	18.028	17.365	17.134	16.568	...	0.015	0.014	0.018	0.030	1	0	0	0	0	0	
447	1146	00:46:53.91	85:16:44.	...	18.137	17.369	17.089	17.037	...	0.016	0.014	0.017	0.043	1	0	0	0	0	96	
448	-1	00:44:14.43	85:13:44.	...	18.376	17.390	17.032	16.622	...	0.020	0.014	0.017	0.031	1	0	0	0	0	98	
449	4554	00:48:11.00	85:17:03.	...	18.165	17.391	17.064	17.122	...	0.017	0.014	0.017	0.091	1	0	0	0	0	97	
450	-1	00:49:54.01	85:11:22.	...	18.371	17.392	16.940	...	...	0.020	0.014	0.015	...	1	0	0	0	1	90	b
451	-1	00:44:32.24	85:16:40.	...	18.238	17.408	17.111	16.972	...	0.018	0.014	0.018	0.080	1	0	0	0	0	96	
452	-1	00:50:47.98	85:11:25.	18.931	17.803	17.411	17.235	...	0.029	0.012	0.014	0.019	...	0	0	0	0	1	21	
453	1134	00:46:33.08	85:13:54.	...	18.245	17.412	17.198	...	...	0.018	0.014	0.019	...	1	0	0	0	1	97	
454	1165	00:48:58.36	85:14:34.	...	18.309	17.436	17.277	17.043	...	0.019	0.015	0.020	0.085	1	0	0	0	0	97	
455	4555	00:46:02.50	85:15:35.	19.854	18.193	17.439	17.108	16.891	0.067	0.017	0.015	0.074	0	0	0	0	0	97		
456	-1	00:47:55.20	85:18:04.	...	17.445	16.902	...	...	...	0.015	0.015	0.015	...	1	1	0	0	0	97	
457	-1	00:45:18.98	85:14:28.	...	18.331	17.456	17.101	16.628	...	0.019	0.015	0.018	0.072	1	0	0	0	0	97	
458	-1	00:46:48.83	85:18:58.	...	18.886	17.457	17.163	17.516	...	0.018	0.015	0.018	0.130	1	0	0	0	0	95	
459	-1	00:46:08.81	85:18:55.	18.776	17.848	17.484	17.440	...	0.026	0.013	0.019	0.023	...	0	0	0	0	0	98	
460	-1	00:44:43.60	85:10:32.	...	18.304	17.488	17.188	17.626	...	0.019	0.015	0.019	0.142	1	0	0	0	0	98	
461	-1	00:44:04.30	85:15:26.	...	18.323	17.492	17.190	...	...	0.019	0.015	0.019	...	1	0	0	0	1	96	
462	-1	00:52:33.66	85:15:54.	...	18.033	17.500	17.343	...	...	0.029	0.012	0.042	...	1	0	0	0	1	0	
463	4220	00:48:50.97	85:14:41.	...	18.617	17.503	17.101	16.876	...	0.024	0.016	0.017	0.073	1	0	0	0	0	84	
464	-1	00:51:11.14	85:19:17.	...	18.240	17.503	17.303	...	...	0.018	0.015	0.021	...	1	0	0	0	1	0	
465	4313	00:49:15.32	85:14:21.	...	18.349	17.503	17.324	17.231	...	0.019	0.016	0.021	0.100	1	0	0	0	0	87	
466	1143	00:46:35.74	85:17:18.	...	18.570	17.522	17.188	17.177	...	0.023	0.016	0.019	0.049	1	0	0	0	0	94	
467	-1	00:51:08.31	85:16:14.	...	17.532	17.319	...	...	...	0.016	0.021	...	1	1	0	0	0	97		
468	-1	00:52:08.85	85:19:05.	...	18.430	17.536	17.184	...	...	0.021	0.016	0.019	...	1	0	0	0	1	59	
469	-1	00:52:33.51	85:15:54.	19.246	17.992	17.544	17.317	...	0.039	0.014	0.016	0.021	...	0	0	0	0	1	97	
470	-1	00:44:33.68	85:09:18.	20.077	18.425	17.545	17.198	...	0.081	0.021	0.016	0.019	...	1	0	0	0	1	96	
471	-1	00:44:39.94	85:18:27.	18.447	17.548	17.055	...	...	0.021	0.016	0.017	0.019	...	1	0	0	0	1	97	
472	-1	00:44:02.43	85:15:33.	...	18.144	17.554	17.392	...	...	0.016	0.016	0.022	...	1	0	0	0	1	49	
473	-1	00:52:25.25	85:11:03.	...	18.412	17.560	17.241	...	...	0.020	0.016	0.020	...	1	0	0	0	1	59	
474	-1	00:51:05.19	85:10:05.	...	18.427	17.561	17.317	...	...	0.021	0.016	0.021	...	1	0	0	0	1	91	
475	-1	00:52:05.71	85:14:33.	...	18.516	17.592	17.348	...	...	0.022	0.017	0.021	...	1	0	0	0	1	96	
476	-1	00:45:17.21	85:19:06.	...	18.422	17.593	17.222	...	...	0.021	0.017	0.019	...	1	0	0	0	1	78	
477	-1	00:48:37.37	85:10:02.	...	18.491	17.598	17.325	16.880	...	0.022	0.017	0.021	0.073	1	0	0	0	0	88	
478	4464	00:49:16.99	85:15:58.	...	18.547	17.600	17.359	...	...	0.023	0.017	0.022	...	1	0	0	0	1	97	
479	-1	00:51:48.63	85:13:23.	18.535	17.653	17.469	...	...	0.023	0.018	0.024	...	1	0	0	0	1	92		
480	-1	00:50:03.65	85:19:07.	...	17.666	16.867	...	...	...	0.018	0.018	0.027	...	1	0	0	0	1	79	
481	1144	00:46:54.15	85:17:31.	18.753	17.680	17.257	...	...	0.028	0.018	0.020	...	1	0	0	0	1	94		
482	4328	00:47:32.97	85:17:56.	18.748	17.682	17.399	16.896	...	0.027	0.018	0.023	0.075	1	0	0	0	0	90		
483	-1	00:50:58.20	85:10:00.	...	18.636	17.694	17.237	16.768	...	0.025	0.018	0.019	0.066	1	0	0	0	0	0	
484	4322	00:49:21.67	85:16:29.	18.533	17.699	17.455	...	...	0.024	0.018	0.024	...	1	0	0	0	1	97		
485	-1	00:50:54.18	85:15:43.	18.195	17.709	17.600	...	...	0.017	0.018	0.027	...	1	0	0	0	1	90		
486	4260	00:50:24.21	85:17:39.	18.702	17.717	17.492	...	...	0.026	0.019	0.025	...	1	0	0	0	1	94		
487	1133	00:46:35.66	85:13:41.	18.876	17.729	17.402	18.124	...	0.031	0.019	0.023	0.226	1	0	0	0	0	0		
488	-1	00:44:18.27	85:19:06.	18.391	17.730	17.516	...	...	0.020	0.019	0.025	...	1	0	0	0	1	76		
489	4401	00:49:09.99	85:15:38.	18.596	17.751	17.500	...	...	0.027	0.019	0.025	...	1	0	0	0	1	89		
490	-1	00:51:49.88	85:14:57.	18.736	17.807	17.554	...	...	0.027	0.020	0.026	...	1	0	0	0	1	95		

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	Magnitude*				Magnitude Error				Flag				Membership Probability				Comments		
				u'	g'	r'	i'	u'	g'	r'	i'	u'	g'	r'	i'	u'	g'	r'	i'	u'		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
491	4515	00:48:28.57	85:12:09.	...	18.765	17.829	17.610	...	...	0.028	0.021	0.027	...	1	0	0	0	0	1	76	
492	-1	00:52:16.64	85:12:12.	...	18.857	17.851	17.491	...	...	0.030	0.021	0.024	...	1	0	0	0	0	1	95	
493	-1	00:47:25.88	85:19:01.	...	18.736	17.874	17.600	...	...	0.028	0.021	0.027	...	1	0	0	0	0	1	92	
494	2378	00:50:38.17	85:12:03.	...	17.911	17.414	17.414	...	...	0.022	0.021	0.023	...	1	1	0	0	0	1	87	
495	-1	00:44:39.31	85:14:33.	...	18.889	17.911	17.523	...	...	0.031	0.022	0.025	...	1	0	0	0	0	1	97	
496	-1	00:45:33.70	85:13:42.	...	19.096	17.913	17.273	...	...	0.037	0.022	0.020	...	1	0	0	0	0	1	90	
497	4441	00:49:42.29	85:16:09.	...	19.091	17.921	17.554	...	...	0.037	0.022	0.026	...	1	0	0	0	0	1	92	
498	4496	00:50:33.89	85:15:05.	...	18.302	17.934	17.934	...	...	0.019	0.023	0.023	...	1	0	0	1	0	1	0	
499	-1	00:47:53.31	85:09:46.	21.554	...	17.956	17.376	...	0.315	...	0.023	0.022	0.022	...	0	1	0	0	0	1	70	
500	-1	00:45:16.98	85:09:24.	...	17.963	17.471	17.471	...	...	0.023	0.024	0.024	...	1	1	0	0	0	1	0	
501	1174	00:47:57.67	85:13:36.	...	17.979	17.296	17.296	...	...	0.024	0.021	0.021	...	1	1	0	0	0	1	90	
502	-1	00:45:24.97	85:16:09.	...	17.999	17.999	17.999	...	...	0.024	0.024	0.024	...	1	1	0	1	0	1	0	
503	-1	00:44:44.27	85:16:32.	...	18.419	18.021	17.851	...	...	0.021	0.024	0.033	...	1	0	0	0	0	1	0	
504	-1	00:45:33.65	85:17:51.	...	18.023	17.329	17.329	...	...	0.024	0.021	0.021	...	1	1	0	0	0	1	0	
505	-1	00:46:05.42	85:09:07.	...	19.020	18.036	17.640	...	...	0.035	0.025	0.028	...	1	0	0	0	0	1	79	
506	-1	00:49:10.83	85:19:31.	...	18.535	18.060	17.874	...	...	0.024	0.025	0.034	...	1	0	0	0	0	1	0	
507	-1	00:44:18.11	85:18:50.	...	18.744	18.065	17.873	...	...	0.027	0.025	0.034	...	1	0	0	0	0	1	0	
508	-1	00:48:42.82	85:19:33.	...	18.091	17.825	17.825	...	...	0.026	0.033	0.033	...	1	1	0	0	0	1	0	
509	-1	00:46:26.29	85:09:50.	...	18.549	18.093	17.933	...	...	0.023	0.026	0.036	...	1	0	0	0	0	1	0	
510	4571	00:47:08.84	85:17:54.	...	18.130	17.674	17.674	...	...	0.027	0.029	0.029	...	1	1	0	0	0	1	87	
511	-1	00:44:30.93	85:14:38.	...	18.151	16.983	16.744	...	...	0.027	0.016	0.034	...	1	1	0	0	0	1	0	
512	-1	00:51:43.91	85:13:34.	...	18.157	17.312	17.312	...	...	0.027	0.030	0.030	...	1	1	0	0	0	1	90	
513	-1	00:45:38.23	85:12:42.	...	19.257	18.161	18.005	...	...	0.043	0.028	0.039	...	1	0	0	0	0	1	98	
514	-1	00:52:40.21	85:17:36.	...	18.163	17.640	17.640	...	...	0.028	0.028	0.028	...	1	1	0	0	0	1	88	
515	-1	00:46:15.93	85:13:34.	...	19.333	18.165	18.066	...	...	0.047	0.041	0.041	...	1	0	0	0	0	1	97	
516	-1	00:47:57.13	85:09:56.	...	18.170	17.827	17.827	...	...	0.028	0.033	0.033	...	1	1	0	0	0	1	75	
517	4435	00:46:52.72	85:16:35.	...	18.173	17.473	17.473	...	...	0.028	0.024	0.024	...	1	1	0	0	0	1	87	
518	-1	00:52:02.29	85:18:20.	...	18.197	17.689	17.689	...	...	0.028	0.029	0.029	...	1	1	0	0	0	1	89	
519	-1	00:52:02.62	85:12:52.	...	18.229	17.929	17.929	...	...	0.029	0.030	0.030	...	1	1	0	0	0	1	95	
520	-1	00:48:10.18	85:09:22.	...	18.261	17.922	17.922	...	...	0.030	0.035	0.035	...	1	1	0	0	0	1	41	
521	-1	00:51:55.07	85:17:46.	...	18.298	18.011	18.011	...	...	0.031	0.039	0.039	...	1	1	0	0	0	1	91	
522	-1	00:40:10.11	85:08:47.	18.897	18.300	18.300	...	...	0.031	0.031	0.031	...	1	0	0	1	1	0	0		
523	-1	00:49:09.88	85:12:55.	18.307	18.018	18.018	...	...	0.032	0.032	0.039	...	1	1	0	0	0	1	88		
524	1177	00:45:56.30	85:15:17.	18.309	17.840	17.840	...	...	0.032	0.033	0.033	...	1	1	0	0	0	1	89		
525	-1	00:47:05.02	85:11:05.	18.317	17.842	17.842	...	...	0.032	0.033	0.033	...	1	1	0	0	0	1	88		
526	-1	00:48:55.00	85:09:06.	18.337	18.337	18.337	...	...	0.032	0.032	0.032	...	1	1	0	0	0	1	91		
527	-1	00:48:49.02	85:19:23.	18.373	17.957	17.957	...	...	0.033	0.037	0.037	...	1	1	0	0	0	1	95		
528	-1	00:47:17.61	85:08:46.	18.823	18.393	18.393	...	...	0.029	0.034	0.034	...	1	1	0	0	0	1	28		
529	4708	00:51:08.93	85:14:53.	18.400	18.400	18.400	...	...	0.034	0.034	0.034	...	1	1	0	0	0	1	89		
530	-1	00:46:18.06	85:10:41.	18.410	18.410	18.410	...	...	0.034	0.034	0.034	...	1	1	0	0	0	1	0		
531	1170	00:47:34.15	85:14:23.	18.415	18.522	18.522	...	...	0.035	0.062	0.062	...	1	1	0	0	0	1	91		
532	1171	00:46:41.44	85:15:49.	18.418	18.119	18.119	...	...	0.035	0.043	0.043	...	1	1	0	0	0	1	95		
533	-1	00:46:33.96	85:19:14.	18.429	18.429	18.429	...	...	0.035	0.035	0.035	...	1	1	0	0	0	1	28		
534	2368	00:48:23.97	85:12:36.	18.441	17.908	17.908	...	...	0.035	0.035	0.035	...	1	1	0	0	0	1	89		
535	1167	00:48:13.12	85:15:22.	19.162	18.446	18.189	...	...	0.040	0.036	0.046	...	1	1	0	0	0	1	0		
536	-1	00:44:03.69	85:18:52.	18.456	17.965	17.965	...	...	0.036	0.037	0.037	...	1	1	0	0	0	1	63		
537	1173	00:47:21.41	85:12:31.	19.081	18.458	18.458	...	...	0.037	0.036	0.036	...	1	1	0	0	0	1	0		
538	2358	00:48:44.64	85:12:05.	18.463	18.044	18.044	...	...	0.036	0.040	0.040	...	1	1	0	0	0	1	90		
539	4748	00:51:02.97	85:13:56.	18.466	18.466	18.466	...	...	0.036	0.036	0.036	...	1	1	0	0	0	1	0		

Table 4—Continued

Star ID	WEBDA ID	RA	DEC	u'	g'	Magnitude*	i'	r'	z'	u'	g'	Magnitude Error	i'	r'	z'	u'	g'	Flag	r'	i'	z'	Membership Probability	Comments
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
540	4364	00:50:13.85	85:17:30.	...	...	18.478	...	...	...	0.037	...	1	1	0	1	1	0	0	0	0	0	0
541	4623	00:50:29.24	85:12:10.	...	...	18.496	16.980	16.456	...	0.037	0.016	0.028	1	1	0	0	0	0	0	0	0	0
542	-1	00:47:53.66	85:10:59.	...	...	18.536	17.862	...	...	0.039	0.034	...	1	1	0	0	0	0	1	1	1	1
543	-1	00:52:34.19	85:11:20.	...	...	18.536	18.148	...	...	0.039	0.043	...	1	1	0	0	0	0	1	1	1	84
544	-1	00:44:19.72	85:13:12.	...	...	18.559	...	...	...	0.039	...	...	1	1	0	0	0	0	1	1	1	94
545	-1	00:45:09.07	85:10:07.	...	...	18.602	...	...	...	0.041	...	...	1	1	0	0	0	0	1	1	1	0
546	-1	00:44:58.48	85:11:26.	...	...	18.616	17.778	...	...	0.041	0.031	...	1	1	0	0	0	0	0	0	0	92
547	-1	00:45:17.92	85:15:15.	...	...	18.619	18.101	...	...	0.042	0.042	...	1	1	0	0	0	0	1	1	1	94
548	2371	00:49:11.98	85:14:13.	...	...	18.631	...	...	...	0.042	...	...	1	1	0	1	1	0	1	1	1	86
549	-1	00:45:36.92	85:09:53.	...	...	18.679	...	...	...	0.044	...	...	1	1	0	1	1	0	1	1	1	91
550	-1	00:49:55.23	85:10:43.	...	...	18.727	...	...	...	0.046	...	...	1	1	0	1	1	0	1	1	1	0
551	-1	00:45:13.55	85:10:22.	...	...	18.741	17.963	...	...	0.046	0.037	...	1	1	0	0	0	0	1	1	1	78
552	1178	00:46:07.44	85:13:49.	...	...	18.754	16.995	16.288	...	0.047	0.016	0.025	1	1	0	0	0	0	0	0	0	0
553	4250	00:47:12.27	85:17:26.	...	...	18.761	...	...	...	0.047	...	...	1	1	0	0	0	0	1	1	1	1
554	1129	00:48:53.73	85:14:09.	...	...	18.767	...	...	...	0.048	...	...	1	1	0	1	1	0	1	1	1	0
555	-1	00:51:36.91	85:13:07.	...	...	18.770	17.662	...	...	0.048	0.028	...	1	1	0	0	0	0	1	1	1	0
556	2370	00:49:09.61	85:13:43.	...	...	18.781	...	...	...	0.048	...	...	1	1	0	1	1	0	1	1	1	85
557	-1	00:44:35.96	85:16:50.	...	...	18.801	...	...	...	0.049	...	...	1	1	0	1	1	0	1	1	1	21
558	1176	00:45:46.38	85:17:16.	...	...	19.589	18.844	...	...	0.064	0.051	...	1	1	0	1	1	0	1	1	1	13
559	4189	00:48:28.02	85:17:26.	...	...	18.863	...	...	...	0.052	...	...	1	1	0	1	1	0	1	1	1	0
560	-1	00:44:23.90	85:14:31.	...	...	18.865	...	...	...	0.052	...	...	1	1	0	1	1	0	1	1	1	93
561	-1	00:44:14.41	85:11:10.	...	...	18.919	...	...	...	0.054	...	...	1	1	0	1	1	0	1	1	1	87
562	1131	00:47:54.99	85:14:40.	...	...	18.985	17.933	...	...	0.059	0.037	...	1	1	0	0	0	0	1	1	1	87
563	1172	00:48:05.90	85:14:33.	...	...	19.978	...	...	...	0.146	...	...	1	1	0	1	1	0	1	1	1	85
564	-1	00:45:22.19	85:13:35.	...	...	20.288	18.749	...	...	0.192	0.076	...	1	1	0	0	1	0	1	1	0	0
565	-1	00:43:54.95	85:12:09.	...	...	17.163	...	...	...	0.018	...	...	1	1	0	1	1	0	1	1	1	0
566	-1	00:43:51.17	85:17:29.	...	...	16.942	16.987	...	...	0.015	0.041	...	1	1	0	0	0	0	1	1	1	91
567	-1	00:43:54.67	85:12:17.	...	...	16.140	16.107	...	...	0.008	0.022	...	1	1	0	0	0	0	1	1	1	95
568	-1	00:44:13.13	85:09:30.	15.653	...	...	...	...	0.003	...	...	0	1	1	1	1	1	1	1	1	71	
569	-1	00:44:12.46	85:09:34.	14.549	...	...	...	...	0.002	...	...	0	1	1	1	1	1	1	1	1	-1	
570	-1	00:50:44.21	85:17:33.	15.660	12.120	...	...	...	0.006	0.003	...	0	1	1	1	1	1	1	1	1	d	
571	-1	00:44:12.52	85:09:31.	15.660	12.120	...	...	...	...	0.006	0.003	...	0	1	1	1	1	1	1	1	d	

Notes:

*Note: The magnitudes presented here have not been corrected for reddening, unlike the tables presented in Rider et al. (2004)

Column (1): ID numbers are ordered in increasing r' magnitude. For multiple observations of a star the r' magnitude with smallest error is used.Column (2): A value of -1 indicated that there was no `webd` entry matching the star's coordinates.

Column (3): RA is listed in 2000 coordinates in HH:MM:SS.S format.

Column (4): DEC is listed in 2000 coordinates in DD:MM:SS format.

Columns (15-19): A flag of 1 indicates either saturation or no detection in the given filter.

Column (20): A membership probability of -1 indicated that there is no membership information for that star.

Column (21) comments:

(a) $|g' - r'| - 2(r' - i')| > 0.5$ mag

(b) double star

(c) bright star nearby

(d) bright star saturation